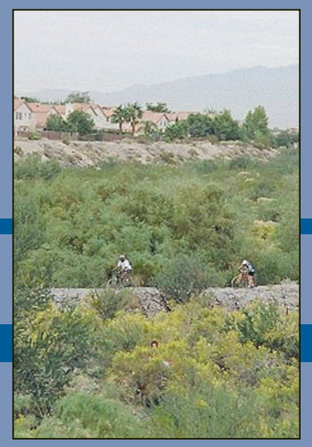
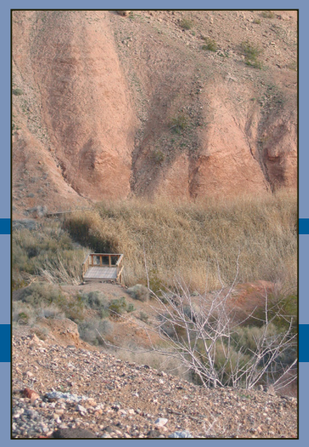
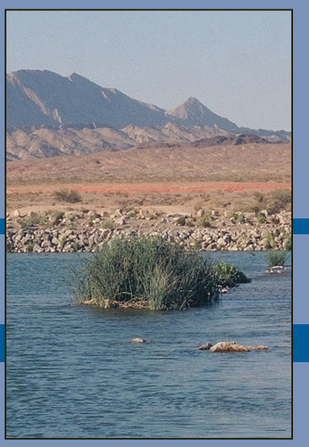
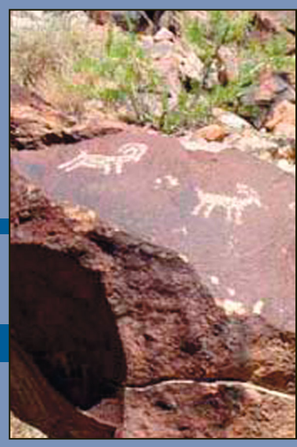
CITY OF HENDERSON

OPEN SPACE AND TRAILS PLAN

Adopted December 6, 2005

A Place To Call Home

ACKNOWLEDGEMENTS

Elected and Appointed Officials

Mayor and Council
James B. Gibson, Mayor
Amanda M. Cyphers, Councilman, Ward I
Andy A. Hafen, Councilman, Ward II
Jack K. Clark, Councilman, Ward III
Steven D. Kirk, Councilman, Ward IV

Planning Commission
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Paul Bunker, Vice-Chairman
George Bochanis, Commissioner
Craig Burr, Commissioner
Dale Lay, Commissioner
Debra March, Commissioner
Gerri Schroder, Commissioner

Parks and Recreation Board
Cathy Rosenfield, Chairman
David Crine, Vice Chairman
Mike Harris
David Holmes, Ph.D.
Dundee Jones
David Kallas
Blair Parker
Dennis Savell
Glenn Schroder

Open Space Plan Advisory Committee

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Jane Feldman	Sierra Club
Lou Godino	Horse Council of Nevada
John Holman	River Mountains Loop Trail Partnership
Debra March	City of Henderson Planning Commission
Melissa Nelson	Station Casinos
Alan O'Neill	Outside Las Vegas
George Reyling	Citizens for N. McCullough Open Space
Cathy Rosenfield	Parks and Recreation Board
Richard Serfas	American Nevada Corporation
Vicki Van Meetren	St. Rose Dominican Hospital

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Dirk Richwine	Assistant Parks and Recreation Director
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Open Space Plan Funding Source
SNPLMA Special Account

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All photos were taken in or around the City of Henderson by EDAW or the City of Henderson unless otherwise noted.

CHAPTER 1:
INTRODUCTION

"What are the natural features which make a township handsome? A river, with its waterfalls and meadows, lake, a hill, a cliff or individual rocks, a forest, and ancient trees standing singly. *Such things are beautiful; they have a high use which dollars and cents never represent. If the inhabitants of a town were wise, they would seek to preserve these things, though at a considerable expense; for such things educate far more than any hired teachers or preachers, or any present recognized system of school education. I do not think him fit to be the founder of a state or even of a town who does not foresee the use of these things."*

Henry David Thoreau
Journal, 1861

Open Space and Parks Spectrum

Open Space

In the context of this plan, open space is defined as an interconnected system of protected lands that are conserved in their natural state, restored, or improved with appropriate native landscaping to retain a natural or natural-appearing condition. Open space areas provide resource conservation, visual, wildlife, and recreational benefits, as well as relief from urban development. Allowed uses vary depending upon resource sensitivity and management objectives, but some areas can accommodate passive recreational uses and facilities such as trails, trailheads, overlooks, rest areas and interpretive signage.

Nature Preserves: Clark County Wetlands Park, Bird Viewing Preserve

Natural Areas: Whitney Mesa Nature Preserve, Lake Las Vegas Wetlands Park

Corridors: Pittman Wash

Common Areas

Areas set aside for the use and benefit of the residents of a particular subdivision or development. These areas vary widely in character, from sites with developed facilities to sites that retain a more natural character. Typically, these areas are privately owned and maintained by the developer or homeowner association.

Streetscapes

Medians

HOA Lands

Parks

Park areas programmed for active recreational use. These areas are typically owned and maintained by the City and contain an array of developed uses, recreational facilities, and landscape improvements.

Community Parks

Neighborhood Parks

Sports Complexes

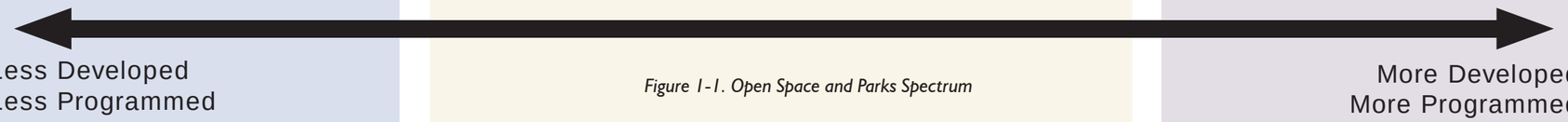


Figure 1-1. Open Space and Parks Spectrum

INTRODUCTION

The Mojave Desert is home to many unique desert plants and animals, in addition to being our home. As the most arid desert in North America, the Mojave is a place of beauty and displays an intricate evolutionary interplay between water, earth, and life. Mountain and desert wild land backdrops, and the natural areas within the City define our community's sense of place and provide opportunities for recreation and relaxation. Especially notable in the desert are its washes, ridgelines, and mountain chains—which are critical lifelines for plants and animals.

The Mojave is also home to the fastest growing city in America: the City of Henderson. With a current population of approximately 246,000, the City is expected to continue to experience tremendous population growth in West Henderson and through infill projects. Because the City of Henderson still has extensive areas of vacant lands and is adjacent to public lands, many residents take the region's open space for granted. But even newcomers can see that development is beginning to affect the landmarks that make Henderson a place to come home to: its mesas, mountains, and washes. Thus, residents and City leadership have acknowledged the need to begin protecting the special places that make Henderson a desirable community.

Today, as Henderson's focus shifts from industry to lifestyle, the quality of the natural environment can no longer be seen as an "amenity." Rather, it is essential to the evolution of a successful and sustainable community, cultivating civic identity, stimulating development, and providing a reprieve from the often overwhelming intensity of urban life. Residents and business owners increasingly demand that the City work to protect the region's special places, create a connected trail system, and provide natural amenities within urban areas.

Open space and trails are good investments; open space improves our quality of life, provides an escape from the urban setting, promotes awareness and respect for our desert environment, and defines a buffer for growth. Trails accommodate several of the most popular recreation activities residents enjoy, such as walking, jogging, bicycling, walking with pets, photography, or just simply relaxing. There is a growing recognition that cities that provide quality natural environments continue to attract brain power, economic investment, and creativity. Open space investments truly pay dividends for those cities bold enough to plan, protect, finance, and build attractive and centrally-located parks, open space, and trail systems.

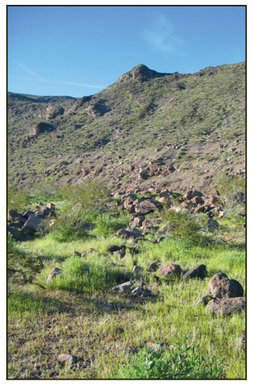
In a recent community-wide survey, 9 out of 10 residents stated that preserving open space was important to them, and 8 out of 10 residents stated that increasing the number of trails and walking paths was important.

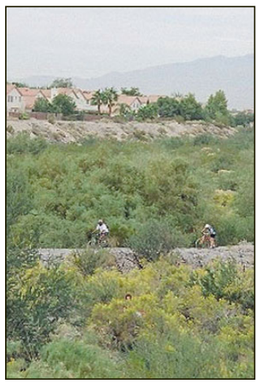
The City has defined a goal of respecting the land and integrating the desert environment into the community as it grows. Henderson aims to protect, restore, and conserve the beauty of our desert home, provide wildlife corridors and habitat for birds, and provide relief for residents from continuous development. Henderson is *learning to conserve through development*, as demonstrated by recent master planned communities built around the "green infrastructure" of trails, greenways, natural washes, and open spaces.

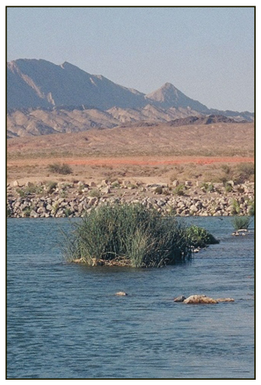
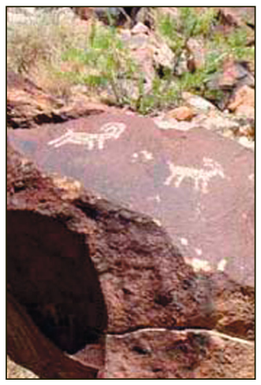
WHAT IS OPEN SPACE?

Open space occurs on a spectrum, from natural environments, to common areas, to parks. Often, natural open spaces occur within or adjacent to programmed park sites, such as Equestrian Park (at Magic Way and Equestrian Drive), or the dune formations at Sunset Park as shown in Figure 1-1.

In the context of this plan, *open space is defined as an interconnected system of protected lands that are conserved in their natural state, restored, or improved with appropriate native landscaping to retain a natural or natural-appearing condition*. Open space areas provide resource conservation, visual, wildlife, and recreational benefits, as well as relief from urban development. Allowed uses vary depending upon resource sensitivity and management objectives, but some areas can accommodate passive recreational uses and facilities such as trails, trailheads, overlooks, rest areas and interpretive signage.





Bicycle and Pedestrian Facilities Spectrum

On-Street Lanes

Shared Roadways

Bike Lanes

Bike Routes

Sidewalks / Shared Use Paths

Many sidewalks adjacent to streets in Henderson are landscaped and designed to carry large amounts of pedestrians. However, due to the number of curb cuts and intersections, motorized vehicle conflicts at sidewalks are not ideal for other users, such as bicyclists and in-line skaters.

Primary and Secondary Trails

Trails provide connections to parks, schools, employment areas, and retail centers for recreational and non-motorized use. They often occur within vehicular right-of-ways, with landscaping or other barriers that physically separate users from motor vehicle traffic. However, trails ideally occur in non-vehicular corridors such as utility corridors, flood control channels, or railroad easements, featuring appropriate pedestrian amenities, aesthetic enhancements, and connections.

Landmark Corridors

Trails can be located in open space corridors that have regional significance and are recreational destinations in and of themselves, or lead to or through destinations such as Wetlands Park, Lake Mead, or Sloan Canyon National Conservation Area. These corridors provide a greater degree of connectivity, interpretation, safety, pedestrian amenities, and grade-separated crossings.

Most Vehicular Conflicts
Least Recreative

Least Vehicular Conflicts
Most Recreative

Figure 1-2. Bicycle and Pedestrian Facilities Spectrum

WHAT IS A TRAIL?

Trails also occur on a spectrum, ranging from soft-surface trails in backcountry areas to shared-use paths adjacent to major roadways (see Figure 1-2). In urban areas, Henderson seeks to set a new standard for what makes a trail: *ideally, trails occur in non-vehicular corridors with appropriate pedestrian amenities, aesthetic enhancements, and connections.* Although this is not always an achievable goal (especially in built areas), Henderson seeks to separate pedestrians from vehicles in order to enhance safety and the recreational experience, as well as promoting functional alternative modes of transportation. *On-street lanes, sidewalks, and other "neighborhood trails" (6-8 foot sidewalks within subdivisions) are not addressed in this plan*, but will be addressed in updates of transportation, bicycle, and pedestrian plans, such as the Master Streets and Highways Plan.

OTHER IMPORTANT TERMS USED IN THIS PLAN

Green Infrastructure

Green infrastructure is a planning approach that attempts to maximize the benefits ecosystems provide to surrounding human populations. The counterpart to green infrastructure is gray infrastructure, the system of human-constructed elements (roads, water treatment plants, airports, etc.) that supports our lifestyles. While the pervious character of green infrastructure allows plant and animal communities to flourish and water to infiltrate the soil, the impervious character of gray infrastructure generally excludes nature and prevents absorption of water.

In order to encourage thriving natural and human communities, green infrastructure planning treats open spaces as a necessary and beneficial aspect of urban and suburban environments. By incorporating green space networks into our communities, we improve our own quality of life as well as the health of the natural world. Green infrastructure plans also help us decide how to expand our communities in the best possible manner, just as gray infrastructure plans help us efficiently distribute services to human populations. Both types of infrastructure must be planned judiciously to ensure the best future for us and for the ecosystems we live in.

Ecosystem Services

Ecosystem services are the processes of the natural world that provide benefits to human communities. These benefits come in many forms and are often forgotten when planning for human populations. Ecosystem services provide us with, for example, clean water, habitat for raising and harvesting food, climatic moderation and protection from ultraviolet solar radiation, detoxification and decomposition of waste products, purification of air, recycling of essential nutrients, pollination of crops and natural vegetation, etc. Without these benefits, human communities would deteriorate and eventually cease to function. Hence, we must consider and place great importance on ecosystem services when developing our communities.

Landscape Ecology

Landscape ecology is a discipline that studies the interactions between organisms at a scale large enough to show emergent spatial patterns and structures (viewing the Earth from an airplane window provides a good sense of the scale of landscapes). These patterns and structures transform over time and can be roughly divided into patches, corridors or strips, and background matrices. Various factors such as weather, soils, precipitation, solar aspect, elevation, etc., determine how these spatial patterns array themselves on the land. As human communities have consumed ever more open space, however, pre-existing ecosystems have been disrupted and altered. Roads, for example, fragment landscapes and create barriers that are difficult for plants and animals to cross. Understanding landscape ecology and applying its principles enable planners and designers to create strategies for human communities that respect and value the natural world.

Citizens Steering Committee field trip with Sarah Sutherland (Sloan Canyon NCA)

Citizen Steering Committee field trip to Pittman Wash

Phase	Tasks	Timeframe	Communication and Participation Methods
Project Initiation and Inventory	Project Initiation Natural Resource Inventory Trails Inventory Agency Interviews Vision Development	October 2004 – January 2005	Public Meeting #1 Webpage Newsletter
Analysis	Natural Resource Analysis Needs Assessment	January 2005 – March 2005	Webpage Postcard Mailing Utility Bill Insert
Framework Development	Opportunities and Constraints Framework Themes	April 2005 – May 2005	Public Meeting #2 Webpage Press Release Newsletter
Recommendations	Principles and Policies Implementation Strategies Action Plan Draft Plan	June 2005 – September 2005	Public Meetings #3 and #4 Draft Sections for Comment Webpage Press Release Newspaper Advertisement Radio Announcement TV news spotlight Newsletter Draft Report for Comment
Adoption	Final Plan	August 2005 – November 2005	Property Management Committee Parks and Recreation Board Meeting Planning Commission Public Hearing City Council Public Hearing

Table 1-1. Public Involvement Process

Public Meeting #1

Public Meeting #3

WHAT WILL THIS OPEN SPACE PLAN ACCOMPLISH?

Some view land primarily as a source of wealth, a commodity that is bought and sold, an investment, a subject of laws and regulations, a matter of real estate, an object for tax policies, or a resource of the free market. Others view land primarily as a living dynamic system, a place to live, a habitat containing plants and animals, a site of history, culture, aesthetics, and inspirations, or something that is planned, conserved designed, managed, and cared for. Often these two perspectives are framed as being directly incompatible to one another in popular discourse, although that is not the case.

The City of Henderson seeks to balance these seemingly competing goals. The purpose of the Open Space and Trails Plan is to take advantage of some clear opportunities to protect special places, provide accessible trails, and conserve natural resources while maintaining the City's vibrant economy. The Plan focuses on protecting lands for resource conservation, wildlife, or passive recreational activities like jogging and horseback riding. Like parks, open space increases property values and provides educational opportunities, in addition to providing a number of "free" ecosystem services like flood storage. Principles and policies established in the Plan will be incorporated into the City's Comprehensive Plan. In conjunction with the 2005 Comprehensive Plan Update, the Plan assists in answering important questions about how to best improve citizens' quality of life, such as:

Special Places

- What special places in Henderson should be protected? What should be the priorities?
- Are there other ways to protect special places besides acquiring them?
- How should open spaces be funded and managed?

Edges

- How should urban development relate to protected desert environments?
- How can public access be maintained at the edge, while still protecting the desert environment?

Trails and Corridors

- How can we enhance trail system connectivity? How can the trail classification system be improved?
- How can flood control projects better contribute to an interconnected system of wildlife habitat areas, parks, trails and open space? Specifically, how can we better utilize flood control projects for pedestrian circulation? Should we incorporate aesthetic treatments (including landscaping) in the design of storm drainage improvements?
- Should we protect significant natural channels as greenways and landscape features?

Guiding Principles

In February 2004, City Council adopted a set of guiding principles for developing an Open Space and Trails Plan. City Council direction formed the basis for the vision, principles, and policies presented in Chapter 3.

These guiding principles are reinforced by City Council's vision and priority for natural resource management: "to protect and preserve our natural resources for future generations."

City Council Open Space and Trails Plan

Guiding Principles

1. Recognizing that open space improves our quality of life, provides an escape from the urban setting, and defines a buffer for growth, we should continue to provide open space areas of our community.
2. Because of the potential loss of open space resources that may be caused by growth, there is an urgency to develop a plan that identifies natural areas that are appropriate for continued and future preservation.
3. In developing a common definition of open space, which may be used to develop standards and future goals, it is key to recognize the various types of open space located throughout our community and ensure that the multiple needs of our diverse population are balanced.
4. Take advantage of natural resources and ensure the protection of sensitive lands, including hillsides, view sheds, natural drainage facilities, and areas containing wildlife, cultural, historical, and biological resources, through the initiation of conservation strategies and the promotion of public education regarding open space issues.
5. Enhance opportunities to provide trail connections between local and regional facilities, open spaces, and residences, and adjacent federal lands, including the Sloan Canyon National Conservation Area.
6. In promoting fiscally sound open space planning, it is important to: 1) understand the various funding sources available for open space preservation and development, and 2) create a sensible and realistic plan that recognizes future operations and maintenance costs incurred by the City as a result of plan implementation.

— adopted February 2004

HOW WAS THE PLAN CREATED?

The Plan was prepared under the direction of City Council, the Planning Commission, and the Parks and Recreation Board. Each of these commissions provided key considerations and strategies at regular intervals throughout the planning process during public work sessions. A Citizens Steering Committee, with representation from a cross-section of the community, met regularly for 10 months in a public forum to debate and refine the Plan's content. A Technical Advisory Committee composed of City staff from nine separate departments also met monthly to coordinate and contribute to the Plan. The consulting firm EDAW and the National Park Service's Rivers, Trails, and Conservation Assistance Program assisted in facilitating the planning process.

In addition to the many City Council, Planning Commission, Parks and Recreation Board, and Steering Committee work sessions that were open to the public, several other public input opportunities were provided including four public meetings at four separate locations throughout the City (Table 1-1).

In addition to ensuring numerous public participation opportunities, the project team consulted regularly with Clark County, the Southern Nevada Regional Planning Coalition, the Regional Transportation Commission, the Regional Flood Control District, BLM staff representing the Sloan Canyon National Conservation Area, and other agencies to ensure trail connectivity and achievement of conservation objectives. Comments from each public event were recorded and reflected in the plan. Thus, the Plan's recommendations truly represent the values of a broad and diverse community.

HOW IS THE PLAN ORGANIZED?

Chapter 2: Today summarizes the City's growth trends, existing open space and trail resources, relevant policies, and other related issues. Chapter 3: Tomorrow establishes a common vision, an Open Space and Trails Framework, principles and policies, a list of potential projects, and design guidelines for trail facilities. Chapter 4: Strategies identifies open space protection, management, and financing strategies, trail prioritization strategies, and an action plan.

Works Consulted

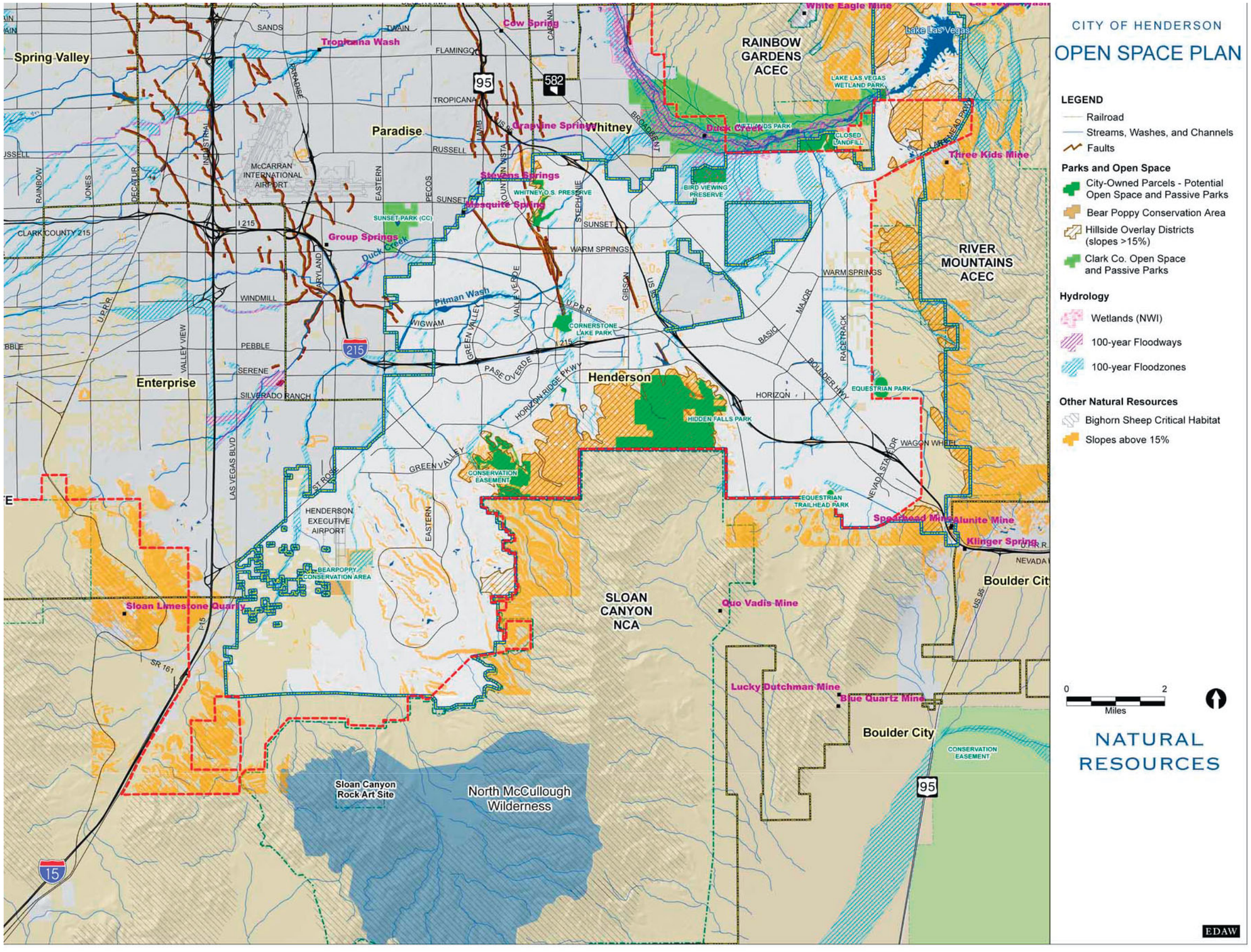
Dramstad, W. E., J. D. Olsen, and R. T. Forman. *Landscape Ecology Principles in Landscape Architecture and Land-Use Planning*. Island Press. 1996.

EDAW. *Urban Transformations: Parks as Urban Regenerators*. 2005

CHAPTER 2:
TODAY

"If future generations are to remember us with gratitude rather than contempt, we must leave them more than the miracles of technology. We must leave them a glimpse of the world as it was in the beginning, not just after we got through with it."

President Lyndon B. Johnson
1964


CITY OF HENDERSON
OPEN SPACE PLAN
LEGEND
Railroad
Streams, Washes, and Channels
Faults
Parks and Open Space
City-Owned Parcels - Potential Open Space and Passive Parks
Bear Poppy Conservation Area
Hillside Overlay Districts (slopes >15%)
Clark Co. Open Space and Passive Parks
Hydrology
Wetlands (NWI)
100-year Floodways
100-year Floodzones
Other Natural Resources
Bighorn Sheep Critical Habitat
Slopes above 15%
0
2
Miles
NATURAL RESOURCES
EDAW
Spring Valley
Paradise
Whitney
Enterprise
Henderson
Boulder City
RAINBOW GARDENS ACEC
RIVER MOUNTAINS ACEC
SLOAN CANYON NCA
North McCullough Wilderness
Sloan Canyon Rock Art Site
Lake Las Vegas
Tropicana Wash
Cow Spring
Grapevine Spring
Stevens Springs
Mesquite Spring
Group Springs
Duck Creek
Pitman Wash
White Eagle Mine
Three Kids Mine
Quo Vadis Mine
Lucky Dutchman Mine
Blue Quartz Mine
Spearhead Mine
Alunite Mine
Klinger Spring
Sloan Limestone Quarry
McCARRAN INTERNATIONAL AIRPORT
HENDERSON EXECUTIVE AIRPORT
CLARK COUNTY 215
LAKE LAS VEGAS WETLAND PARK
CLOSED LANDFILL
BIRD VIEWING PRESERVE
WHITNEY O.S. PRESERVE
SUNSET PARK (CC)
CORNERSTONE LAKE PARK
HIDDEN FALLS PARK
EQUESTRIAN PARK
EQUESTRIAN TRAILHEAD PARK
CONSERVATION EASEMENT
BEARPOPPY CONSERVATION AREA
SANDS
TWAIN
FLAMINGO
TROPICANA
RUSSELL
SUNSET
WARM SPRINGS
WINDMILL
PEBBLE
SERENE
SILVERADO RANCH
HORIZON
WAGON WHEEL
GREEN VALLEY
95
582
215
15
SR 161
I 215
US 95
UPRR

I. INTRODUCTION

This chapter describes the trends, regulatory context, and existing conditions of open space and off-street trails in the City of Henderson. It is organized into the following four sections:

II. **Existing Conditions and Issues**: The Existing Conditions and Issues section presents a summary of resource conditions and the issues regarding open space preservation and trails development identified through the public involvement process.

III. **Trends**: The Trends section includes recreational and population trends. This section demonstrates the demand for more complete open space and trail networks in the City.

IV. **Planning Context**: The Planning Context section includes pertinent plans and legislation that guide open space and trails planning in the City.

V. **Opportunities and Constraints Summary**: The Opportunities and Constraints Summary section presents suggestions for future projects and constraints which may hinder project implementation.

Steep, erosive soils, such as these at Whitney Mesa, are visibly impacted by off-road vehicle and cross-country trail use.

II. EXISTING CONDITIONS AND ISSUES

Natural Setting

The City of Henderson is situated in the Mojave Desert, the smallest of the four American deserts. The Mojave Desert lies within southwestern Utah, southern Nevada, southeastern California, and western and northwestern Arizona. It is the most arid desert in North America, averaging only two to four inches of rain annually. Elevation ranges from 1,301 feet to 3,492 feet above sea level. Landforms in the Valley are characterized by gentle desert slopes, transitioning to alluvial fans and steep hills and ridgelines. The Northern McCullough Mountains, Lake Mead, Las Vegas Wash, Whitney Mesa, the River Mountains, and numerous smaller washes are significant landmarks in the area.

Soils and their biological, chemical, and physical processes play a central role in the persistence and sustainability of ecosystems, because they link plants, animals, fungi, and bacteria together into cohesive and dynamic systems. Desert soil crusts are biologically active forming a "tough skin" that prevents water and wind erosion, while maintaining water permeability and the process of nitrogen fixation. These crusts are critical to soil fertility and plant growth and are sensitive to disturbance (e.g., off-highway vehicles or even heavy foot traffic). Desert soils are easily compacted and the effects are persistent.

The geomorphology of Henderson is characterized by areas with shifting soils, shrink-swell soils, caliche soils, fluctuating water tables, and fault lines which creates significant development challenges. As a result of the steep slopes, volcanic geology, and desert soils, impacts to hillsides are highly evident, even from distances as far as 10 miles on clear days. Hillside development, road cuts, and blasting (and resulting vibrations and dust) have been repeatedly cited by the public as issues that need to be addressed through the Open Space and Trails Plan.

Figure 2-1, the Natural Resources Map, shows areas currently designated as open space and passive parks, hillside overlay districts, the Bear Poppy Conservation Area, areas with steep slopes over 15%, and desert bighorn sheep habitat.

As Las Vegas has grown, the land has subsided. In 1935 the National Geodetic Survey established a regional first-order level network. By 1963, the downtown area had subsided as much as 3.4 feet. By 1986, it had sunk another 2.8 feet. Comparable subsidence of the Strip is 2.9 feet and North Las Vegas 5.0 feet. The greatest threat is posed by continued growth of earth fissures. These have been mapped and found to be correlated with preexisting Quaternary geologic faults. Land subsidence is projected to continue as a function of ground water withdrawals. In recent years net withdrawals have exceeded recharge by factors of 2 to 3. This can only be alleviated by reduced dependence on ground water which would increase reliance upon already over-allocated surface water (Acevedo, et. al.).

The Federal Emergency Management Area (FEMA) has identified approximately 13,000 acres in the vicinity as potential 100-year flood hazard zones as shown in Figure 2-1. These areas are primarily located within proximity to Las Vegas Wash and Duck Creek. FEMA has also identified 20 acres of flood-impacted areas near the convergence of Las Vegas Wash and Lake Las Vegas. Lake Mead is the primary drinking water source for Henderson (and the rest of the Las Vegas Valley).

The Las Vegas bearpoppy (*Arctomecon californica*) is almost entirely restricted to Clark County. The bearpoppy is listed as Critically Endangered by the State. The BLM manages approximately 102 acres of unimproved land adjacent to the Henderson Executive Airport, located within the City of Henderson. In a 1999 Memorandum of Understanding between the BLM and Clark County, the 102-acre BLM Parcel was set aside for a minimum of 30 years for noise mitigation as part of an inter-agency Las Vegas Bearpoppy Conservation Agreement. The Memorandum of Understanding requires that the BLM will manage the 102-acre parcel as open space and that it would not allow activities that "could have any adverse effects upon open space, conservation or natural resources or the airport safety, noise attenuation or buffer zone purposes."

The City has annexed land designated as an Area of Critical Environmental Concern (ACEC). The River Mountains ACEC includes 11,360 acres of land extending east of the city, approximately 640 acres of the River Mountains ACEC is within the City. The River Mountains ACEC protects habitat for the Desert Bighorn Sheep (*Ovis canadensis nelsoni*). The Sloan Canyon National Conservation Area (SCNCA) is adjacent to the City's southern boundary. The NCA was designated by Congress to preserve its primitive, undeveloped qualities. The City of Henderson Bird Viewing Preserve includes reclaimed water treatment facilities that provide nesting and feeding habitat for over 200 bird species.

Bighorn sheep, Nevada's state animal, are native to the mountain range with a current population of approximately 250 animals. The herd in the Northern McCullough Range is one of the most important in Nevada and is used as a "source" population. In an effort to increase declining populations, sheep are moved from this herd to other areas of Nevada with limited number of sheep. The Nevada Department of Wildlife maintains several water developments in

Some sensitive ridgelines are protected through the Hillside Development Ordinance.

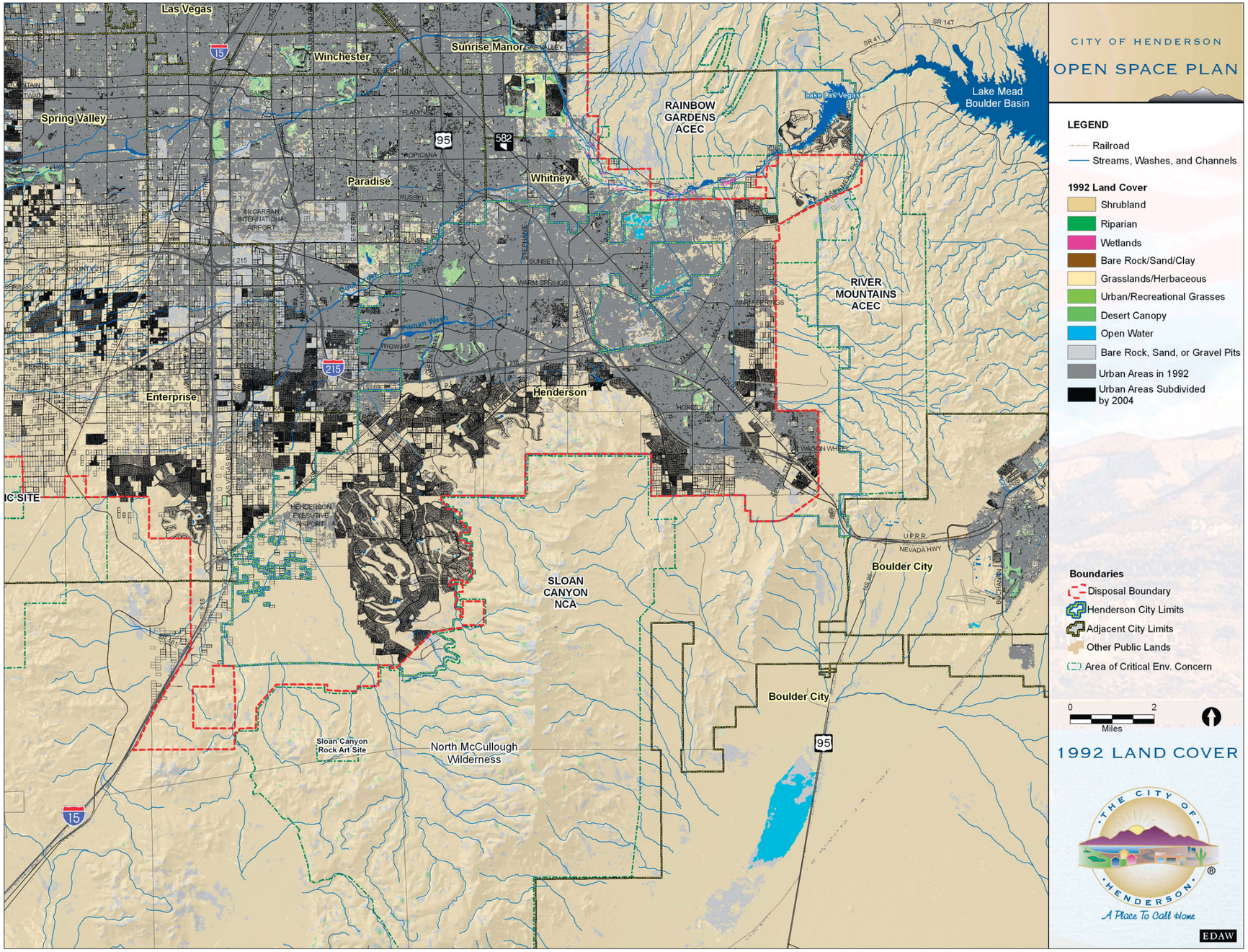


Figure 2-2. Land Use and Land Cover Map. 1992 urban uses in grey; 2005 urban uses in black.

and around the Sloan Canyon NCA which are critical to sustaining the herd. Historically, the sheep were able to migrate to nearby mountain ranges and springs when water sources became dry; migration is no longer possible due to highways and increasing automobile traffic which prevents migration. Besides bighorn sheep, a variety of wildlife utilize the developments including birds, bees, foxes and coyotes.

Significant growth in Henderson and throughout the Las Vegas Valley has adversely affected air quality. The Environmental Protection Agency has declared the Las Vegas Valley to be in serious non-attainment for PM10 and carbon dioxide (CO2) in the Valley. PM10, particulate matter with a diameter of 10 microns or less, is produced by wind-blown dust from vacant land, construction activity, and unpaved roads and parking lots. PM10 is known to cause and aggravate respiratory problems, impair visibility, affect natural systems through accumulation of deposits, and cause aesthetic damage. In addition, the Valley is also in non-attainment status for ozone, which is known to cause respiratory system problems, aggravate existing health conditions such as asthma, and interfere with the ability of plants to produce and store food. Ozone is produced through vehicle exhaust, industrial emissions, chemical solvents, as well as natural sources.

Lastly, illegal dumping, or the unauthorized disposal of solid waste including garbage, motor oil, dirt and rocks, yard waste, tires, and sewage, continues throughout the Las Vegas Valley to be a significant problem especially near urban areas. Construction and demolition sites often use adjacent public lands as a staging area as neighborhoods are built, and public land remains impacted or littered after the project has been completed. Target shooting also takes place with City limits and on adjacent public land, often discouraging public recreational use of these resources.

Plant and Wildlife Resources

Henderson is home to very unique plant and animal species that have evolved to survive harsh conditions. The low rainfall rates coupled with high evaporation rates and the unpredictability of precipitation has been a powerful selective force for plant and wildlife adaptations to aridity. Most plant species in deserts are annual plants, which elude the dry season in a seed highly resistant to desiccation. According to the Desert Conservation Program (Desert Wash Newsletter), eighty percent of the Mojave's annuals are unique to this region and found nowhere else in the world. The most characteristic plant of the Mojave, the creosote bush, is so adapted to dry conditions that it can maintain photosynthetic activity when its tissues have lost almost half their normal water content. Major washes, such as Las Vegas Wash, contain riparian species including Cottonwood and Willow, as well as invasive, non-native species including Tamarisk, Arundo, and Tall Whitetop. Figure 2-2 shows the major land use and land cover types, based on best available data (1992).

As the Valley has grown, wildlife habitats have been converted to other uses and habitat that remains near urban areas has become increasingly fragmented. Table 2-1 lists species of concern that exist or likely exist in or around the City of Henderson, however this is not an exhaustive list. Species of particular concern are covered by the Clark County Multi-Species Habitat Conservation Plan (MSHCP), the continued loss of their habitats increases the likelihood of local extinctions and complicates restoration efforts elsewhere in the region.

Riparian areas provide cover and nesting habitat for several bird species.

Common Name	Scientific Name
Desert bighorn sheep	*Ovis canadensis nelsoni*
Burrowing owl	*Athene cunicularia*
Desert pocket mouse	*Perognathus penicillatus*
Las Vegas bearpoppy	*Arctomecon californica*
Desert tortoise (Mojave Desert pop.)	*Gopherus agassizii*
Big free-tailed bat	*Nyctinomops macrotis*
White-margined beardtongue	*Penstemon albomarginatus*
Yellow twotone beardtongue	*Penstemon bicolor ssp. bicolor*
Rosy twotone beardtongue	*Penstemon bicolor ssp. roseus*

Table 2-1. Species of Concern within the City of Henderson

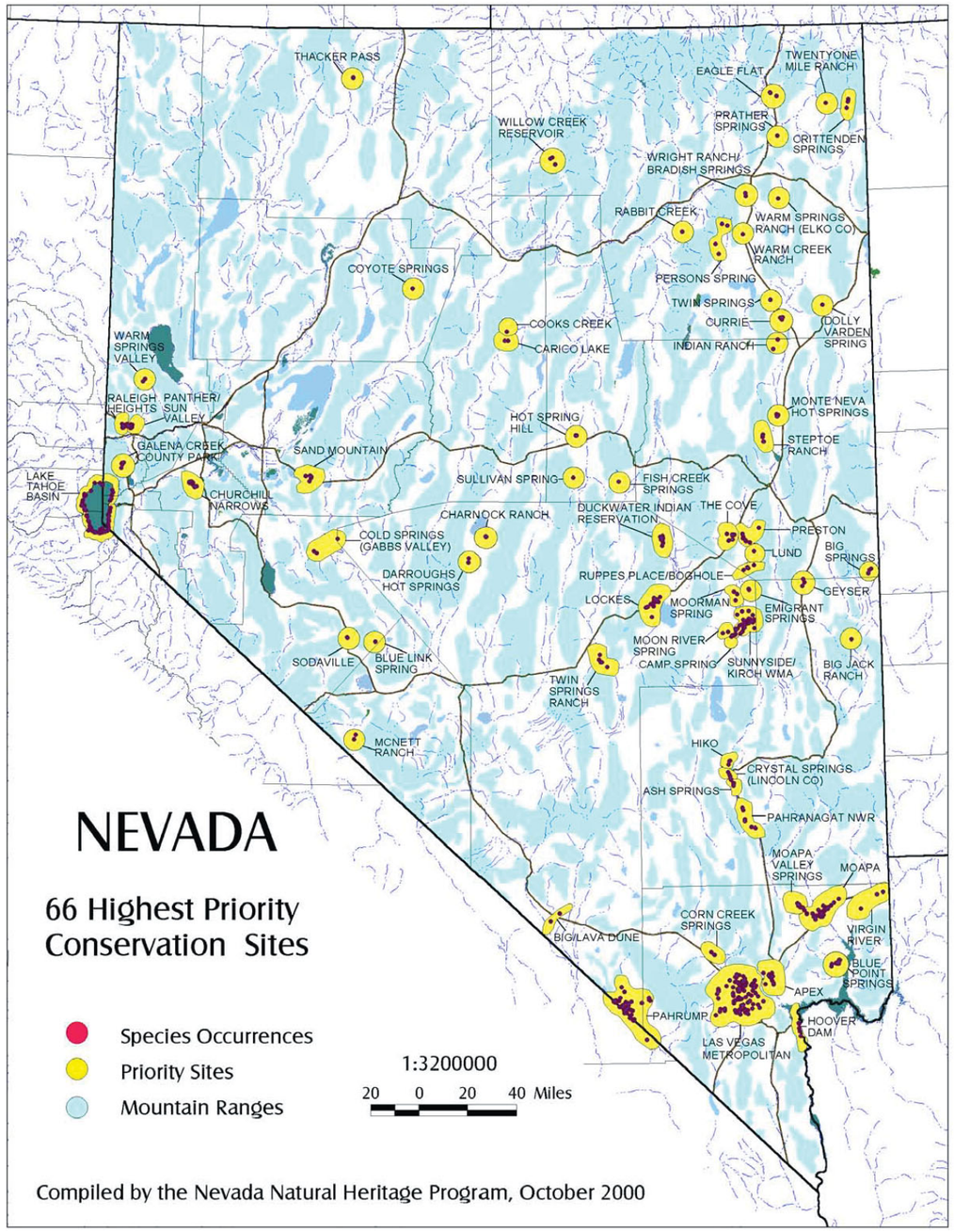


Figure 2-3. Highest Priority Conservation Sites, Nevada Natural Heritage Program

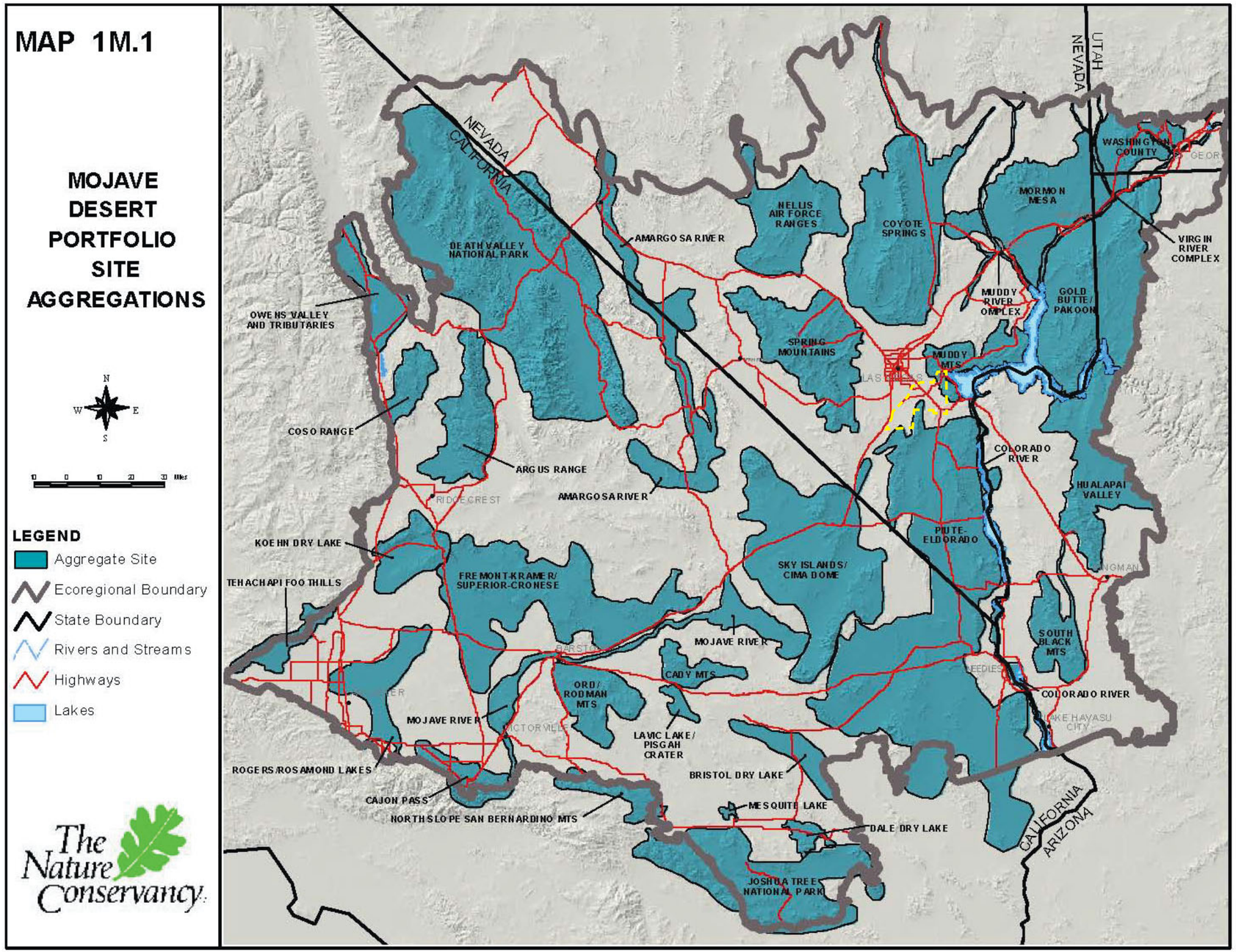


Figure 2-4. The Nature Conservancy Mojave Desert Ecoregional Portfolio

As a result of habitat loss and fragmentation, several studies have prioritized areas in and around Henderson to direct conservation efforts, namely the Nevada Natural Heritage Program (Figure 2-3), The Nature Conservancy Mojave Desert Ecoregion-based Conservation Targets (Figure 2-4), the Desert Conservation Program (through the MSHCP), and the Clark County Environmentally Sensitive Land Project. Most of these studies considered the relative rarity and distribution of targets across the ecoregion, identified target species and communities, set viability guidelines, and developed conservation goals for each target species. Information from each of these studies was used to identify priority conservation sites for the Open Space and Trails Plan. Clark County's MSHCP and Environmentally Sensitive Lands Report have the most bearing on conservation efforts in Henderson, and are described on the following pages.

Multi-Species Habitat Conservation Plan

The MSHCP divides Clark County into four basic conservation management categories (Figure 2-5):

- Intensively Managed Areas (IMAs)
- Less Intensively Managed Areas (LIMAs)
- Multiple Use Managed Areas (MUMAs)
- Unmanaged Areas (UMAs).

Most of the City of Henderson falls within an Unmanaged Area. BLM land surrounding Henderson is part of the Multiple Use Managed Areas and Intensively Managed Areas. Since the MSHCP requires that there is "no net unmitigated loss of habitat," lands compromised through development in the MUMAs and UMAs are recovered in the IMAs and LIMAs. These areas pertain to Federal lands only; there are no restrictions for development on private lands regardless of their MSHCP management category.

As a result of the MSHCP and the permitted "take" of TES species, conservation efforts (including protecting critical lands) are focused on the IMAs and LIMAs beyond the disposal area boundary. Some critics report that due to this decision, any remaining habitat values and conservation efforts within urban and developing areas are essentially "written off." Funds available through BLM land auctions have supported several wildlife and vegetation projects, but none of these projects have occurred within the disposal boundary or the City of Henderson.

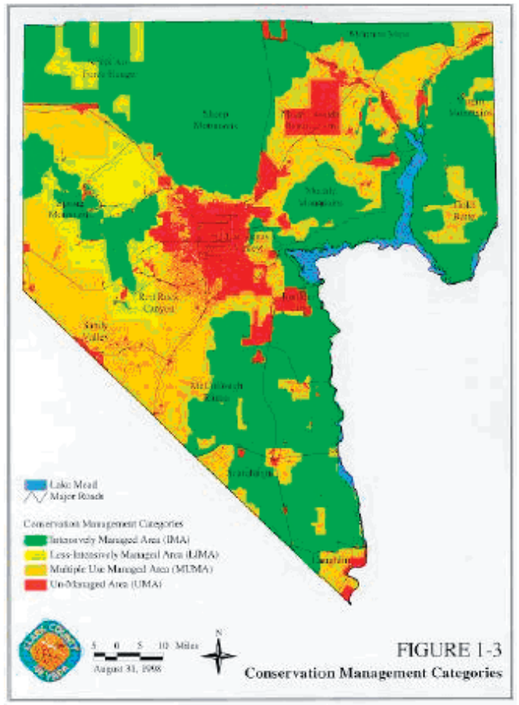


Figure 2-5. Multi-species Habitat Conservation Plan

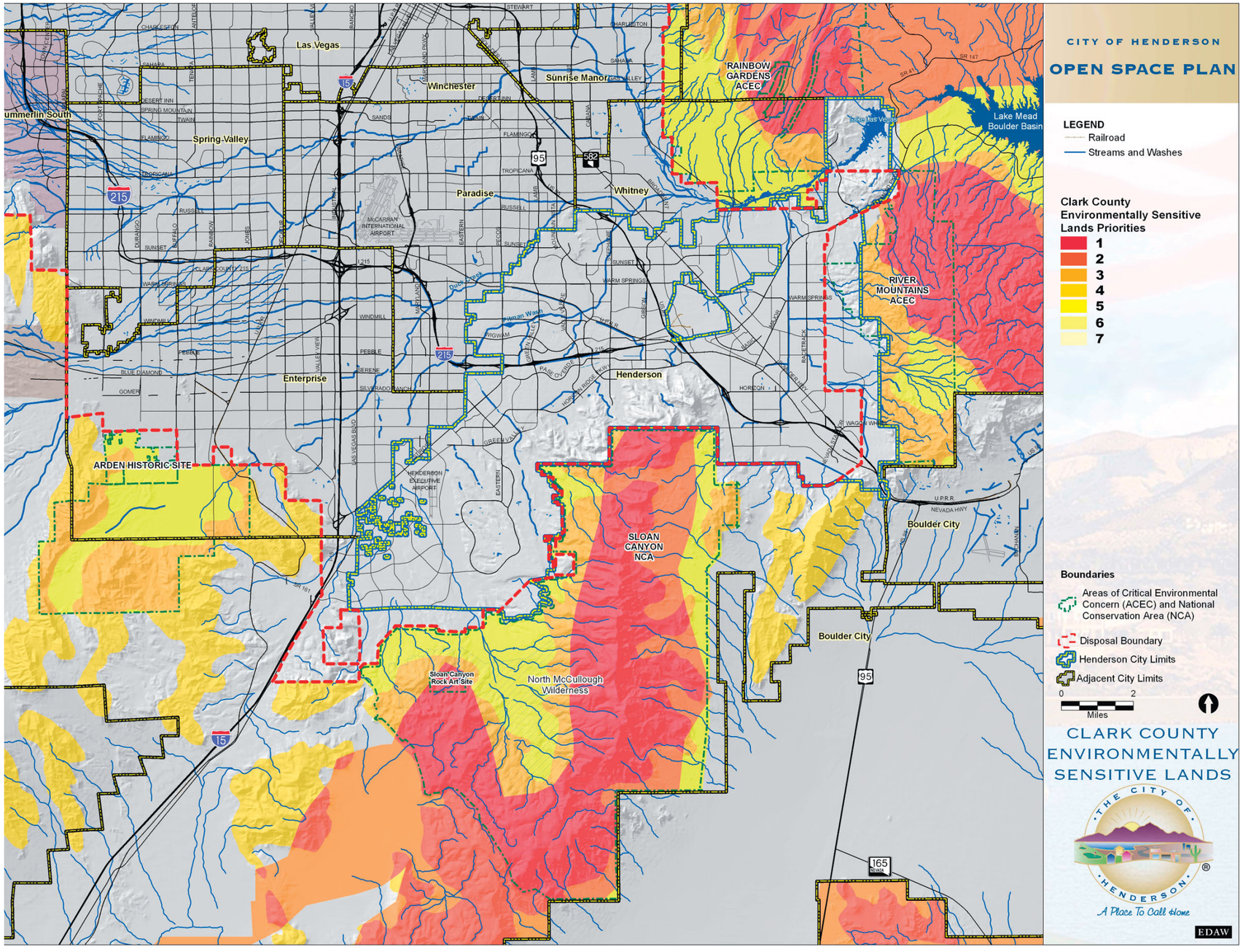


Figure 2-6. Clark County Environmentally Sensitive Lands Adjacent to Henderson

Clark County Environmentally Sensitive Lands Advisory Committee Report

In 2002, the Clark County Board of County Commissioners established the Environmentally Sensitive Lands Advisory Committee and directed staff to establish criteria, priorities, and strategies to address environmentally sensitive lands in Clark County - outside of the disposal area boundary. The Committee developed seven priority levels to prioritize Environmentally Sensitive Lands, shown in Figure 2-6. The seven levels represented a composite value ranking of: biodiversity, aesthetics, administrative areas specifically designated for environmental and recreational purposes, and cultural and historic areas.

While it is important to note that prioritized lands were not mapped in the City of Henderson, the ranking still displays the pattern and proximity of sensitive lands adjacent to the City: obviously Black Mountain, the northwestern range of the McCullough Mountains near I-15, and the River Mountains contain many sensitive resources. As the City expands, ESL priority lands should be considered in land use analyses. It may be advantageous to replicate components of the study methodology to prioritize sensitive lands within the City of Henderson.

The resulting report contained a number of recommendations; the relevant concepts are listed below:

- The County should generally oppose the transfer of current ESLs out of public ownership unless equal or greater protection of those areas can be provided, or the effects mitigated.
- ESL areas should be incorporated into land use plans as they are updated.
- Consideration of whether to include edge conditions and transitional land uses for ESL areas should be specifically included in all land use plan updates.
- Clark County should explore an expanded local government role in protecting and managing ESL areas where appropriate.
- Open space programs may be an important potential implementation mechanism for ESL protection.

Public Lands

As shown in Figure 2-7, Public Lands Map, the City of Henderson is fortunate to be surrounded on three sides by public lands: Rainbow Gardens ACEC (BLM) and Wetlands Park (Clark County) to the north; River Mountains ACEC (BLM), Bureau of Reclamation lands, and Lake Mead National Recreational Areas (NPS) to the east, and Sloan Canyon NCA to the south. The public lands, combined with the steep topography, form a natural edge to the City's future form.

The Southern Nevada Public Lands Management Act (SNPLMA) and the 2002 Land Act established the 2002 Las Vegas Valley Bureau of Land Management Land Disposal Boundary (shown as a dashed red line on Figure 2-7) and a Joint Selection process for auctioning public land. Through the Joint Selection process, the City nominates lands within the 2002 Land Disposal Boundary that will be auctioned and has control over the rate at which lands are sold to developers. Through this process, there is an opportunity for the City to initiate right-of-way and Recreation and Public Purpose (R&PP) applications to secure open space and trail corridors in advance of the auction process.

Clark County and the BLM maintain a policy that public lands outside of the BLM disposal boundary should remain in public ownership and be managed as open space recreational areas. This provides an excellent opportunity for the City of Henderson to leverage public land resources by providing access and ensuring protection of these lands for the benefit of City residents without being responsible for their management.

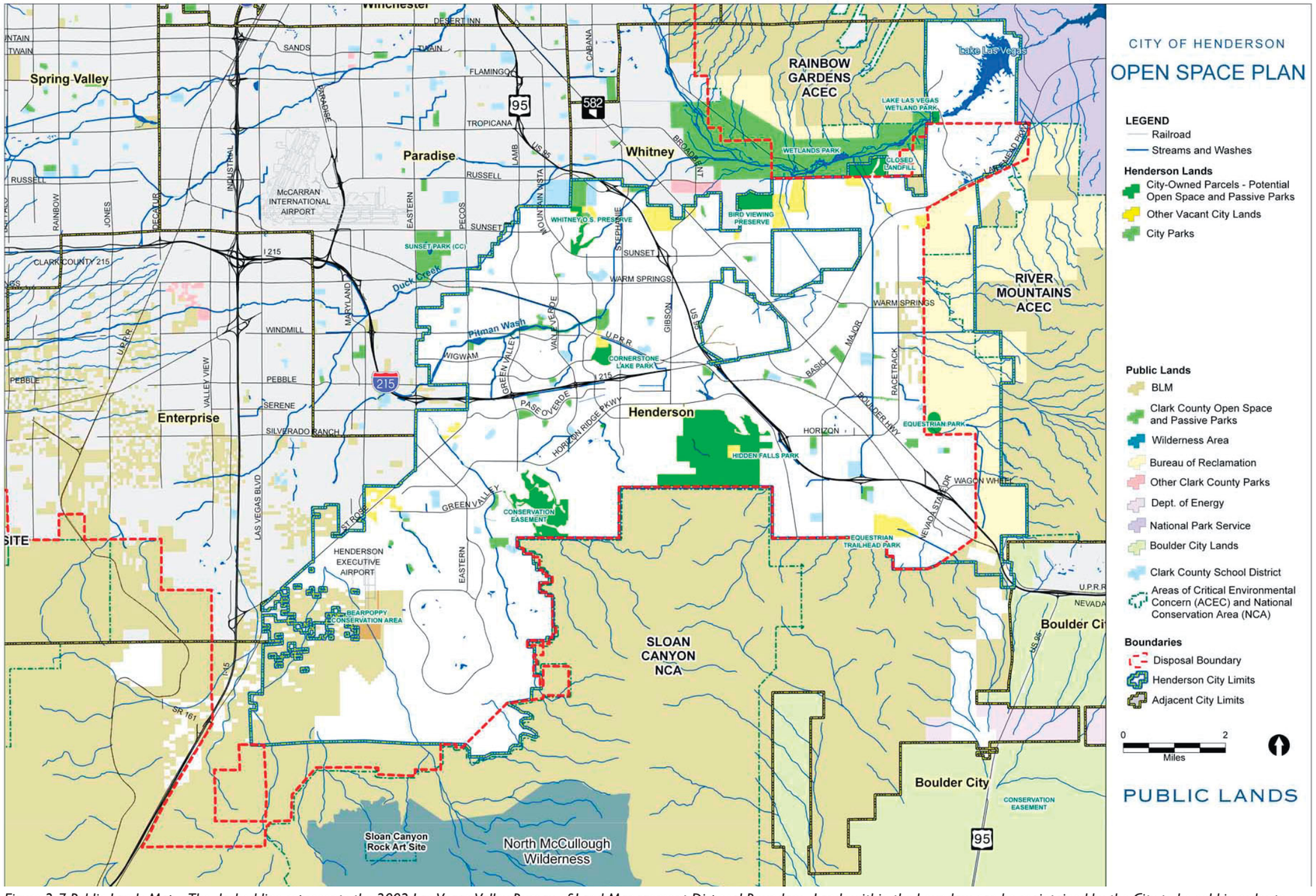


Figure 2-7 Public Lands Map. The dashed line represents the 2002 Las Vegas Valley Bureau of Land Management Disposal Boundary. Lands within the boundary can be maintained by the City to be sold in order to accomodate growth.

Existing City Open Space

The City of Henderson owns approximately 322 parcels of land for a total of 4,746.19 acres. Approximately 72% of the parcels owned by the City of Henderson are for flood control, municipal uses, or open space. The planning team reviewed the City's inventory of lands and determined that approximately 2,350 acres could be considered as open space as defined in Chapter 1 (Table 2.2). However, most of these lands have no formal agreement on their protection; that is, they are subject to disposal or transformation in order to achieve other objectives. Other areas will require extensive restoration in order to achieve a naturally-appearing condition.

Name	Acres	Protected	Funded	Public Access	Location	Comments
Black Mountain	1,377	Small portions have been deeded as open space	N	N	Black Mountain	The City owns 1,377 acres of vacant land on the sides and summit of Black Mountain adjacent to the NCA. Portions of this land were dedicated to the City as "open space" by neighboring developments.
Bird Viewing Preserve	142	Y	Y	Y	North of Water Treatment Facility	This protected Preserve is home to thousands of migratory waterfowl as well as numerous resident desert birds. It contains nine ponds available for birding, surrounded by both paved and dirt paths.
Whitney Mesa Nature Preserve	5	Y	Y	Access provided following design and constr-uction	Near Galleria Drive and Patrick Lane	The Whitney Mesa Nature Preserve is an environmentally sensitive area that is home to historic and cultural resources, wildlife habitat, and natural springs. It was formally protected through the receipt of SNPLMA funds in 2004. The Preserve would include environmental educational opportunities and a network of nearly one mile of recreational biking and hiking trails currently under design and construction.
Whitney Mesa Open Space	35	Y	N	N	Near Galleria Drive and Patrick Lane	As part of a 2005 land exchange and rezoning, an open space network with interpretive trail was zoned north-south along the top and bottom of Whitney Mesa.
Hidden Falls	60	Y	Y	Access provided following design and constr-uction	West of Horizon Ridge Parkway	Construction is underway for this 60-acre park including both neighborhood and community park amenities and open space qualities. Both passive and active recreational opportunities will be provided, although the site has been heavily disturbed by past activities. The park can provide access to Sloan Canyon NCA and non-motorized access is available via the Amargosa Trail.
Equestrian Basin Horse Park and Trailhead	140	Y	Y	Y	Equestrian Dr. & Magic Way	This new park features a figure-eight loop equestrian trail and a second trail on top of and alongside a 20-foot wide flood control berm. Parking and lawn area is provided. The park sits on Bureau of Reclamation lands through easements held by the City.
Cornerstone Park	~30	Park Master Plan in process	Y	Access provided following design and constr-uction		As part of a multi-use detention basin, this park will support multiple uses and feature a 20-acre lake fed by groundwater following its restoration from gravel mining activities. The park will connect to several planned trails such as the UPRR and the existing Pittman Wash Trail. Restoration of portions of this site would provide both active and passive recreational and hiking opportunities as well as wildlife habitat.
Lake Las Vegas Wetland Park	24.9	Y	N	Access provided following design and constr-uction	Mouth of Lake Las Vegas above Lake Las Vegas Parkway	Interpretive pathways and wetland restoration are planned adjacent to the Clark County Wetlands Park.
Pitman Wash	~95.9	Y	Y	Y	Near Windmill from Pecos to Arroyo Grande	This semi-natural flood control channel is the focus of Project GREEN, whose purpose is to protect and restore one of the few remaining large areas of natural habitat in the Green Valley area. The project has three goals: 1) Remove the existing tamarisk and replace it with various other native species of plants, 2) Re-establish the native riparian habitat, 3) Create a recreational trail for the community to enjoy the natural surroundings.
Canyons Conservation Easement	408	Legal transaction in process	N	N	SW of Green Valley and Horizon Ridge Parkway	Deed to conservation easement pending agreement between partners. No public access as land remains private.
Vineyard Conservation Easement	29	Legal transaction in process	N	N	Railroad Pass adjacent to Vineyard Subdivision	Potential Conservation Easement. No public access as land remains private.
Lake Las Vegas Conservation Easement	TBD	Y	Y	N	Lake Las Vegas	Conservation easement dedicated to City in an effort to protect adjacent hillsides. No public access as land remains private.
Total Acres	**~2,350**					

Table 2-2. City Open Space Lands

Existing City Trails

As described in the planning context section, the Master Bicycle and Trails Plan provides a basis for implementing an on-street and off-street system and is enforced through the entitlement process. In determining what constituted a "trail" for the Open Space and Trails Plan, the planning team began with the facility types named in the Master Bicycle and Trails Plan, which are:

- Shared Use Paths and Routes
- Bike Routes
- Bike Lanes
- Rec Trail/Bike Routes
- Shared Use Paths
- Shared Use Paths and Lanes
- Recreational Trails
- Rec Trail/Bike Lanes.

The planning team used the off-street facility types (Shared Use Paths and Recreational Trails) as a basis for creating a future trail system, although many existing shared use paths do not meet the specific definitions of what constitutes a "trail" as found in Chapter 1. A new classification system for the City's trails is discussed in Chapter 3.

As of July 2005 and as detailed in Table 2.2A, Henderson has constructed 25.9 miles of trails and shared use paths. The majority of these trails have been completed since 1999 when SNPLMA funding became available. An additional 38.9 miles are currently funded or under construction. This leaves 130.4 miles of trails proposed in the Master Bicycle and Trails Plan that are not funded or under construction.

Other Trail Issues

The predominant issue for most users, and an obstacle for continued use of the City's trails is the lack of overall connectivity. Although many segments have been completed, often trail users are forced to travel along road shoulders, through parking lots, or sidewalks in order to reach their destination.

PRIMARY TRAIL NAME	Miles Completed	Miles Funded / Under Construction (2-5-year horizon)	Miles Proposed for next 20 years	Total Miles	Percent Complete	Jurisdiction
AMARGOSA TRAIL	2.6	4.8	0.1	7.5	35%	Henderson
ANTHEM EAST TRAIL		6.6		6.6	0%	Henderson
ANTHEM WEST TRAIL			2.2	2.2	0%	Henderson
ARROYO GRANDE BL			2.3	2.3	0%	Henderson
BMIC TRAIL			3.0	3.0	0%	Henderson
BOULDER HWY		4.8	3.5	8.3	0%	Henderson
BURKHOLDER BL		3.8	4.0	7.8	0%	Henderson
C-1 CH			4.4	4.4	0%	Henderson
CACTUS WREN TRAIL		0.6		0.6	0%	Henderson
CORONADO CENTER DR			0.8	0.8	0%	Henderson
DUCK CREEK AR			1.7	1.7	0%	Clark County
EQUESTRIAN TRAIL	1.6			1.6	100%	Henderson
FOCUS TRAIL			2.9	2.9	0%	Henderson
FOOTHILLS TRAIL			2.4	2.4	0%	Henderson
GALLERIA DR			1.2	1.2	0%	Henderson
HENDERSON-JACKSON TRAIL	0.5		0.5	1.0	49%	Henderson
HOOVER-BASIC	1.1		1.4	2.5	45%	Henderson
I 215 TRAIL	0.8		4.1	4.9	16%	Henderson
JEFFREYS ST			0.6	0.6	0%	Henderson / Clark Co
LAKE MEAD DR	1.2		8.3	9.4	12%	Henderson
MARYLAND			3.2	3.2	0%	Henderson
McCULLOUGH HILLS TR		6.5		6.5	0%	Henderson
MEAD-DECATOR			2.9	2.9	0%	Henderson / Clark Co
MT LOOP TRAIL			3.3	3.3	0%	Henderson / Clark Co
NEVADA STATE COLLEGE TRAIL			3.4	3.4	0%	Henderson
OFFSTREET FACILITIES			3.4	1.4	0%	Henderson / Clark Co
PARADISE HILLS DR			0.7	0.7	0%	Henderson
PITTMAN AR	2.9		2.0	4.9	60%	Henderson / Clark Co
RAIL TRAIL			13.1	13.1	0%	Henderson
RAINBOW GARDENS ACCESS TRAIL			2.0	2.0	0%	Henderson
RIVER MT LOOP TRAIL	8.5	0.1	1.6	10.2	84%	Henderson
SEVEN HILLS TRAIL	3.1		0.8	3.9	79%	Henderson
SLOAN LOOP TRAIL			12.5	12.5	0%	Henderson
ST ROSE PK		4.5		4.5	0%	Henderson
SUNSET RD			6.1	6.1	0%	Henderson
UPPR HEND SPUR		0.9		0.9	0%	Henderson
US 95			9.7	9.7	0%	Henderson / Clark Co
WEST HENDERSON TRAIL			4.2	4.2	0%	Henderson
WHITNEY MESA BASE TRAIL			3.4	3.4	0%	Henderson
WHITNEY MESA RIM TRAIL			1.2	1.2	0%	Henderson
TOTAL	**22.3**	**32.5**	**117.0**	**169.8**	**13%**	

Table 2-2A. Trails Status Summary

A second issue is the increasing limited public access to public lands. As private lands adjacent to Bureau of Land Management, Bureau of Reclamation, and Clark County Wetlands Park lands are developed, traditional access to these lands has become limited. Publicly accessible trailheads, signage, and public education regarding available access points needs to be developed in order to limit trespassing of private property. Perhaps more importantly, new development should maintain traditional points of public access.

Third, the desert environment easily lends itself to cross-country trail use (or "social" or "spider-web" trails) which, if uncontrolled, can destroy native vegetation and lead to erosion. Specifically, the BLM is concerned about private and spider web trails entering the Sloan Canyon NCA at undesignated points. Controlled access along trails and proposed roads is especially important in West Henderson north of the entrance to the Sloan Canyon Rock Art Site. Homeowner associations have also created trails, such as the Cityview Trail, which is inaccessible to the public.

Lastly, user conflicts often occur along trails where equestrians and hikers meet off-road vehicle users. Vehicular activities on trails range from casual use on weekends to highly organized and competitive off-road racing. The high speeds and noise of off-road vehicles can spook horses and injure riders as well as children hiking on trails.

Motorcyclist on River Mountains Loop Trail

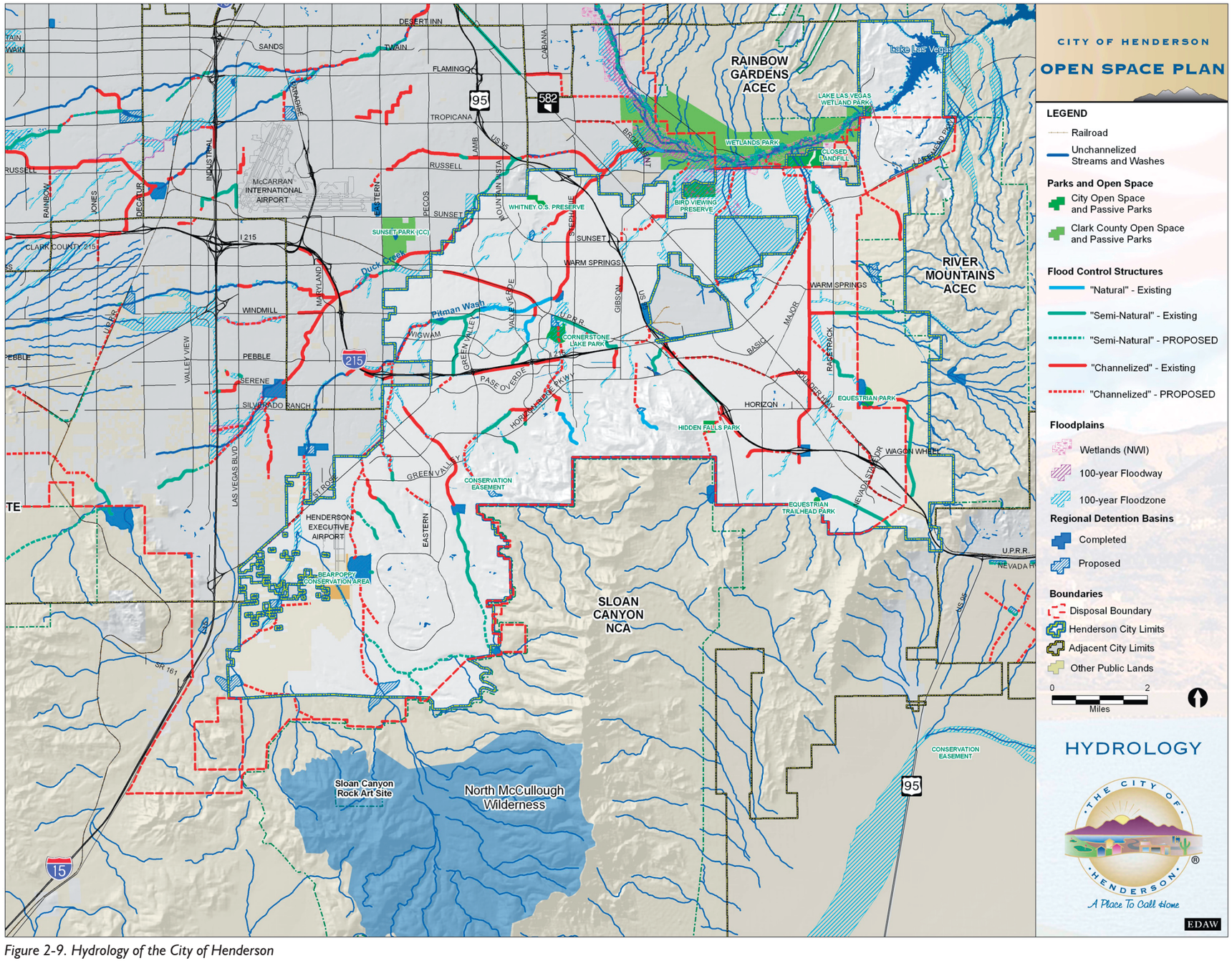


Figure 2-9. Hydrology of the City of Henderson

Storm Drainage Inventory/ Issues

The Clark County Regional Flood Control District (CCRFCD) distributes maintenance and capital improvement funds for flood control facilities according to the CCRFCD master plan. Designs produced by entities or consultants must comply with the Hydrologic Criteria and Drainage Design Manual, available at: www.regionalflood.org. The master plan and EIS (also available online) provide details on proposed projects in the Henderson area. Typically, the CCRFCD purchases the land where the improvement will take place and dedicates it to the entity (in this case, the City of Henderson) following construction.

The Hydrology Map (Figure 2-9), derived from the Clark County Regional Flood Control District Master Plan, illustrates how pervasive storm drainage improvements are within the community. It illustrates how channelization (red line) is the most frequent solution to storm drainage improvements, a design solution that often results in a single purpose project that doesn't realize other potential community benefits. Drainage channels provide connectivity through the entire community, therefore, they are a logical and natural corridor for trails. Fifty-three miles of regional flood control channel have been constructed within the City limits to date, and over 40 additional miles are proposed to be constructed within the current City in the next 20 years (2002 Clark County Regional Flood Control District Master Plan).

Aesthetics

In contrast to streets, trails and other public improvements, aesthetic treatment requirements for flood control facilities have not yet been developed by the City or County. As a result, most drainage channels lack landscaping or other design treatments to soften the utilitarian appearance of the concrete channel and barren right-of-way. In some instances, developers have provided trails, landscaping, and other aesthetic amenities beyond current requirements.

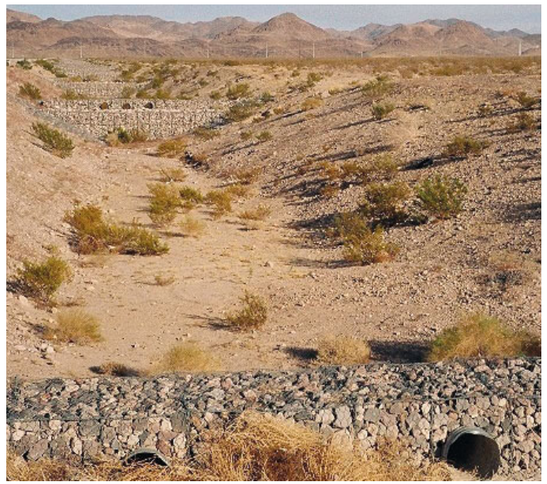
These aesthetic treatment requirements and alternative channel designs may best be examined through a community participation process. There are no current policies that require public involvement in the design of storm drainage improvements. Public input received typically follows partial design. As a result, alternative design approaches are usually not presented or fully considered. Further, the City's development review process is not geared to a consideration of alternative drainage channel design and no policy guidance is provided to encourage a consideration of alternatives. Neighborhoods adjacent to Pittman Wash have formed Project GREEN and have been involved in volunteer planning and design decisions for future improvements. As a result, over 2.9 miles of trails adjacent to the Pittman Wash have been developed and an additional 2.1 miles are planned.

Natural Channels and Floodplains

Due to the rapid pace of growth and funding limitations, the CCRFCD implements the least expensive capital and maintenance cost alternative. In treatments with normal to high flows, concrete-lined channels are typically the preferred method. However, in most cases, storm drainage channel improvements are designed with a minimum width and no provision for a trail or walkway. Drainage crossings and culverts under streets are most often designed only to accommodate storm flows and it is costly to retrofit these structures to accommodate recreational experiences.

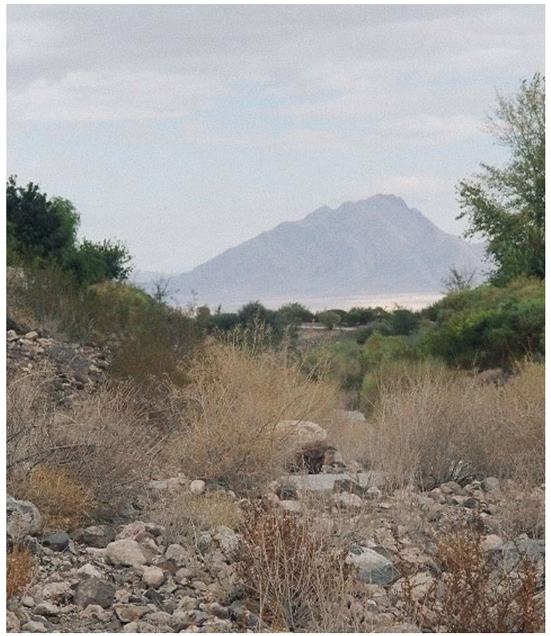
In many cases, a constricted channel design is not a response to the capital and maintenance costs, but is instead a direct response to adjacent or upstream land uses within the floodplain. There are no floodplain development regulations at the City, County, or State level that limit development within the floodplain once approved drainage improvements properly mitigate the flood hazard. Development can also occur directly in the floodway (the channel) until the point where material raises the 100-year flood elevation beyond one-half foot. These land use policies combined with the high price of useable land creates an incentive for property owners to develop the greatest area possible, regardless of proximity to a wash. As a result, storm flows are concentrated in a narrower channel, which are prone to failure without structural reinforcement. Also, because washes and arroyos are intermittent streams they are not regulated by the U.S. Army Corps of Engineers, and landowners have the right to modify, channelize, or culvert them as desired unless wetlands are present.

Section 704-705 of the Hydrologic Criteria and Drainage Design Manual contains design sections



Visually subordinate drop-structures near Racetrack.

A remnant wash between Warm Springs and Sunset provides for off-street trail connectivity.



Natural wash in a Cornerstone neighborhood.

and standards for natural channels. The selection of a natural channel design is generally dependent on the value of developable land versus the cost to remove the said land from a floodplain. The costs for the removal depend on the rate of flow, slope, alignment and depth of the channel as well as material and fill costs for construction of the encroachment. The design sections in Section 704-705 vary from no encroachment to the level of encroachment at which point an improved channel (unlined or lined) becomes more economical.

Despite these disincentives, several notable projects have maintained semi-natural washes that have become an asset the community, such as Henderson's Project GREEN at Pittman Wash or Pueblo Park in the City of Las Vegas. Barriers to replicating these successful projects, such as Project GREEN or Pueblo Park include:

- An assurance that flows stay within the channel.
- Long-term operations and maintenance requirements.
- Real-estate costs (avg. $150,000-300,000 per acre).
- Size and nature of upstream watershed and flood control structures.

Aerial photos of Pittman Wash showing the contrast between concrete-lined channels and soft-surfaced channels.

Naturally-appearing flood control structures are more likely to be considered if:

- They are led by the developer.
- Funds are available to compensate for the difference in least expensive capital and maintenance cost alternative.
- Locations and treatments are proposed with sufficient advance notice.
- Locations downstream of ditches or detention basins that divert or sufficiently decrease channel flows. Such is the case with Pueblo Park in Las Vegas, which essentially retained the landscape feature but diverted most flows upstream.

Clark County Regional Flood Control District Multi-Use Policies

Existing and planned flood control facilities hold significant potential for recreational corridors. The CCRFCD has a policy encouraging recreational uses within flood control facilities, which was adopted during 2001 prior to other regional trails planning efforts. However, the policy is limited by state statute to construct the most cost effective solution for flood control facilities and does not provide funding for joint use facilies. The following are excerpts from this policy:

- In rapidly growing urban areas the creative use and identification of open space opportunities is important. In many cases linear and block flood control facilities can provide opportunities for trails, parks, environmental preserves and many other recreational uses.
- Encourage early planning to identify and take advantage of multiple use opportunities afforded by flood control facilities included on the master plan. Master plans, designs, and capital improvement programs will be made available to entity planning personnel for their use.
- Improve the protection of life and property for existing and future residents from the impacts of flooding inasmuch as multiple uses do not contribute to that mission.
- Restrict the use of CCRFCD funds to implementation of the facilities included on the flood control master plan. CCRFCD funding is not available for the installation, operation, maintenance or rehabilitation of recreation or other non-drainage related facilities located in or with flood control structures.

With these policies in mind, certain considerations can be made during facility planning and design to better accommodate multiple uses. If a flood control facility is to incorporate multiple uses, then the following policy statements must be met:

- Public safety and the proper functioning of the drainage facilities are of the highest concern and cannot be compromised by other uses.
- Flood control facilities must be clearly signed to identify them as areas subject to flooding, and as areas that should not be used during rainfall or floods.
- The establishment of wetlands, passive vegetation zones, or other desirable habitat will require coordination with and approval by appropriate local, State and Federal agencies, as well as the development of a workable habitat management plan that allows for the periodic maintenance of the drainage facilities.
- The use of channel bottoms for recreational uses should be avoided.
- As a condition of the Clark County Regional Flood Control District's acceptance of multi-use plans, the entities will indemnify and hold the District harmless from damages resulting from the use of flood control facilities for recreational activities. The entity that constructed and owns the right-of-way wherein the access is located typically carries liability.

Local agencies do have the ability to include additional local requirements and policies within the Hydrological Criteria and Drainage Design Manual, which establishes design standards for all facilities. Through this mechanism, local agencies can broaden the established regional policies and standards to meet expanded community goals.

City of Henderson Flood Control Facilities

Like other local jurisdictions nationwide, the City of Henderson currently relies on policies established by CCRFCD to guide decisions related to flood control facility design. Since Nevada state statutes only allows the most cost effective solution to be funded with CCRFCD monies, local agencies are responsible for supplementing CCRFCD funds with additional monies for alternate designs. The City has been successful in providing some joint-use facilities through funding sources outside of the CCRFCD (i.e. public-private partnerships and the SNPLMA Special Account).

Multi-Use Opportunities

Good examples of multi-use detention facilities include Desert Breeze, Lower Las Vegas Wash Detention Basin, and Tropicana Detention Basin (by McCarran Airport). Two detention basins in

35-acre Mission Hills Detention Basin in southeast Henderson.

Henderson (Anthem and Arroyo Grande Park) were designed to include multi-uses but have experienced higher than expected maintenance costs and other problems. The CCRFCD does not fund, maintain, or repair any multi-use facilities associated with flood structures, with the exception of debris clean-up. Flood Control District suggestions for multi-use opportunities include:

- In general, passive recreation zones, picnic areas, soccer fields and ball fields may be suitable uses for the lower elevated tiers located above the 10-year pool.
- Tot lots, play areas and court games should be located in the higher elevated tiers located above the 25-year pool.
- Parking areas, rest rooms, concession stands, habitable structures, and swimming pools must be located outside of the 100-year pool elevation.
- Picnic tables, benches, trash receptacles and other amenities located in flood control facilities must be securely fastened in place.
- Most channels have maintenance roads (typically 12-15' width) on one or both sides that may be suitable for pedestrian and biking access. Public Works can identify where access roads are located. A pedestrian separation device separating the channel from the road is required (typically a 6' chain link fence). The pedestrian separation device must be designed and installed in a manner that does not impair normal operations and maintenance activities, or emergency response and rescue activities.

In summary, City and County flood control efforts have been highly effective in constructing flood control facilities to lessen flood impacts to life, health, and property since the creation of the Clark County Regional Flood Control District in 1985. As the Valley's flood control efforts mature, many people have begun calling for greater emphasis on the contribution of flood control facilities to community character, recreation use, and environmental quality. For example, comments provided during a series of four open houses related to the City of Henderson Open Space and Trails Plan were supportive of joint-use flood control facilities. In comparing the mission statements and programs of City and County flood control efforts to other programs in the southwest, it is evident that Las Vegas Valley programs are more limited in their scope (see Table 2-3). As a result, funds for beautification, multi-use, and natural channel protection are often unavailable through City, County or State means.

	Maricopa County Regional Flood Control District	Pima County Regional Flood Control District	Clark County Regional Flood Control District
Mission	"The District's vision is for the residents of Maricopa County and future generations to have the maximum level of protection from the effects of flooding through fiscally responsible flood control actions and **multi-use facilities that complement and enhance the beauty of our desert environment.**"	"Pima County Flood Control District is a regional agency whose mission is to protect the health, safety, and welfare of Pima County residents by providing comprehensive flood protection programs and floodplain management services. These services emphasize fiscal responsibility, **protection of natural resources, and a balanced approach to managing regional watercourses, floodplains, and stormwater resources.**"	"To Improve the protection of life and property for existing residents, future residents, and visitors from the impacts of flooding." The Clark County Regional Flood Control District mission is established by Nevada state statute.
Multi-Use	Yes, built into the mission. Also, "The District's vision is for the residents of Maricopa County and future generations to have the maximum level of protection from the effects of flooding through fiscally responsible flood control actions and **multi-use facilities**."	Yes, built into the mission.	"Encourage early planning to identify and take advantage of multiple use opportunities afforded by flood control facilities included on the master plan. Master plans, designs, and capital improvement programs will be made available to entity planning personnel for their use." While this policy encourages multiple use facilities, state statute does not permit the funding of designs that are not of the lowest capital cost.
Funding Practices	Funds available for multi-purpose projects. For example, on Rio Verde Flood Control Project – "The project will be funded jointly by the District and the City of Peoria. By constructing the trails and implementing landscape improvements in conjunction with the channel improvements, both agencies will be able to maximize public funds."	Joint projects are the norm. The districts funding measure integrates flood control, recreation, and other project benefits. "For the purpose of acquiring, constructing, expanding and improving the flood control facilities of the County, including bank stabilization, channels, drainage ways, dikes, levees and other flood control improvements and river parks and related facilities."	"CCRFD Funding is not available for the installation, operation, maintenance or rehabilitation of recreation or other non-drainage related facilities located in or with flood control structures." Typically, CCRFD implements the least expensive capital and maintenance cost alternative.
Floodprone Land Acquisition Program	Yes, focus on voluntary purchase of homes built in the floodplain.	Yes, takes a proactive approach to acquire open space in floodprone areas.	No
Natural Channel Protection	"The District provides regional protection while identifying unique characteristics and natural habitat that should be preserved…"	Yes. "To encourage the preservation of natural washes and enhance the riverine environment."	No
Aesthetics or Natural Appearance Guidelines	Yes, adopted policy since 1992. "The District constructs facilities that will "fit in" to the community, provide recreation and environmental benefits, and be an amenity for many years to come."	Yes. Vision statement also states that developed facilities should" complement and enhance the beauty of our desert environment."	No
Other Key Policies	"The District is working to preserve natural floodplain characteristics in upstream areas and to discourage development in vulnerable areas."	Has a water resources and riparian habitat management program and assists in implementing the Sonoran Desert Conservation Plan.	--

Table 2-3. Summary of Key Policies on Flood Control/Storm Drainage

III. TRENDS

Conservation and Recreational Trends

Demand for open space, trails, and nature-based recreation is growing at a phenomenal rate nationwide. Locally, City residents have indicated that local parks and recreation facilities and programs are important to defining their quality of life. Three recent surveys in particular illustrate the importance of open space, trails, and recreation opportunities within the State and City, as discussed below.

State and City Demands for Open Space

Nevada's 2003 Statewide Comprehensive Outdoor Recreation Plan Assessment and Policy Plan

The citizens of Nevada are eager to improve the quality and quantity of outdoor recreation opportunities in order to meet the needs of the current population, future populations, and the state's many visitors. Nevada's growing population is placing an increased demand on recreation resources and recreation suppliers at all levels, statewide. New resources need to be identified, acquired, and developed. Eighty-four percent of the respondents to the 2001 citizen's survey on outdoor recreation conducted by the Nevada Division of State Parks said that they participated in an outdoor recreation activity in the year 2000 (DeLoney2001). This statistic coupled with the phenomenal population growth of 6,600 per month from 1990-2000 substantiates that new recreational resources need to be identified. Conservatively, an estimated 5,500 (6,600 x 84%) new recreationists moved into Nevada every month, or 660,000 over the ten year period.

Parks and Recreation Department Survey Highlights (2000)

The City of Henderson Department of Parks and Recreation conducted a citizen survey in 2000 to help determine needs, use levels, and priorities for parks and recreation planning. Of the 1,000 households surveyed, 83% indicated that they had visited a City park during the past year and nearly 50% of households utilize City recreation facilities more than once per month. More than 80% of respondents indicated that the park or facility that they use most often is located within the City. However, 39% of respondents stated that there are not enough trails, parks or open space within walking distance of home; that parks and recreation facilities are not close enough to home to encourage frequent use was among the top reasons offered for not regularly using City parks and trails. "Preserving the environment and protecting open space" was the second most important goal for the City's Parks and Recreation Department according to 41% of the respondents. Neighborhood parks (46%) and walking and biking trails (38%) were the two most common choices of passive recreation for households. It is, therefore, no surprise that respondents indicated that the most important new parks and recreation facilities in the City include adding trails (29%), small neighborhood parks for general use (29%), and additional open space areas (16%). Likewise, the top three choices for improvements to existing parks and recreation facilities included developing loop trails in parks, connecting existing parks with trails, and adding more bike paths/trails.

> *"Outdoor recreation currently exceeds carrying capacity at most recreational areas in proximity to urban areas. There is a public need for additional recreational sites closer to urban centers where use is greatest."*
>
> (Nevada's 2003 Statewide Comprehensive Outdoor Recreation Plan – Assessment and Policy Plan)

The survey includes a "National Benchmarking" section comparing Henderson's response to the responses from communities across the nation. Survey responses and ratings for usage of parks and recreation facilities and programs are considerably higher in Henderson than the national averages. Henderson has the highest percentage of households using parks of any nationally benchmarked community. Approximately 83% of households indicated that they had visited a City park during the past year; whereas, the national average of households visiting a park over the past year was 72%. Henderson also had the highest overall participation in recreational programs. Of responding households, 51% had a household member participate in a program over the past year. This is the highest rating overall, and is nearly twice the national average of 28%.

City of Henderson Community Assessment Survey (2004)

Some of the primary objectives of the 2004 Community Assessment Survey was to examine residents' perceptions of their quality of life, the relative importance of various items on quality of life, and assess residents' sense of community. In total, 1,000 adult residents in the City of Henderson were surveyed regarding City recreational services.

According to the survey, 87% of respondents indicated that "preserving open space" was somewhat important or greater to them, and 93% stated that "increasing the # of trails and walking paths" was somewhat important or greater. Citizens were less satisfied with the city's preservation of open space than they were with other recreational services such as "Maintaining parks and recreation facilities" and "Providing recreation programs for youth". "Preserving open space," was rated as both high in importance and low in satisfaction; it was the only City service that fell into the High Importance-Low Satisfaction quadrant of the Importance-Satisfaction matrix. Compared to public satisfaction with the other recreation services, respondents were not as satisfied with the job the City was doing to increase trails and paths and preserve open space as they were with other recreational programs (Figure 2-10). Respondents with a "high" sense of community also rated recreation services as more important than respondents with medium or low sense of community, indicating that recreational opportunities may be beneficial to fostering a sense of community.

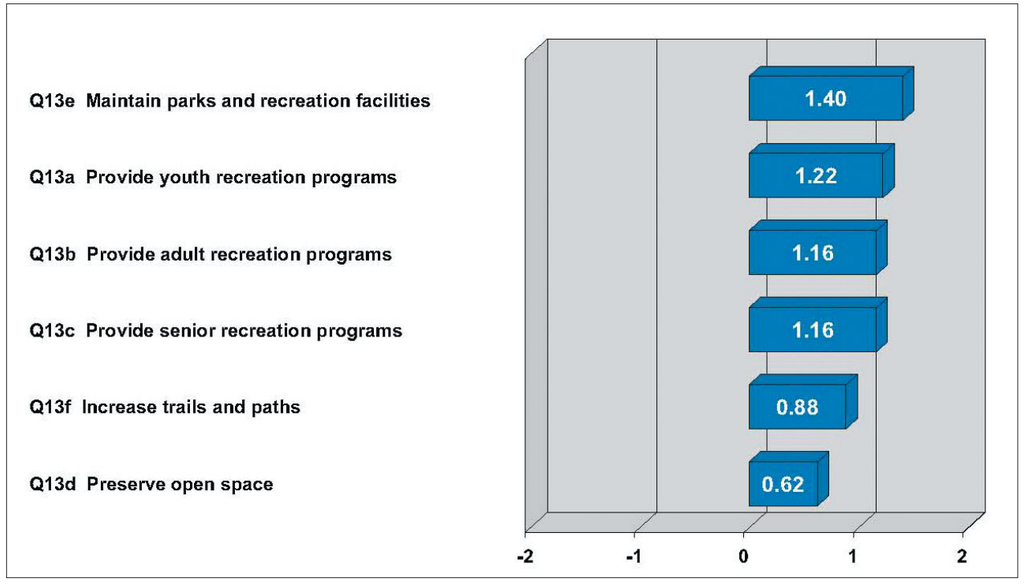


Figure 2-10. Public Satisfaction with Recreational Services
Source: 2004 Community Assessment Survey

Economic Implications of Open Space

First hand experience and recent studies on the economic effect of open spaces have thoroughly demonstrated that investments in trails and open space protection does not "cost" but "pays."[1] First, it is clear that residents will pay a premium to live in close proximity to open space lands and greenbelts.[2] As home prices increase, homebuyers have begun to expect more than simply three bedrooms and a two-car garage; they expect to be part of an active, well-connected community. In fact, studies show that homebuyers identify nearby open space and trails as a top feature when choosing a home.[3] Nearby open space increases property values which generates higher taxes; the resulting increase in taxes more than pays for the open space acquisition in only a short amount of time. [4]

Second, open space enhances the quality of life for businesses and residents, and thus the desirability, image, and marketability of the community as a whole. Cities such as Denver, Colorado; Albuquerque, New Mexico; Scottsdale, Arizona; and Portland, Oregon have found that public investment in parks, open space, and trails has been a major driver in economic revitalization and private investment. Businesses clearly prefer communities that can offer a high quality of life, including an abundance of open space, nearby recreation, and pedestrian-friendly neighborhoods, to their employees. Owners of small companies ranked recreation opportunities, parks, and open space areas as the highest priority in choosing a new location for their business.[5, 6, 7, 8]

Lastly, open space conservation decreases the fiscal costs associated with growth. Said simply, building on floodplains, washes, wetlands, steep slopes, faults, and critical habitats requires extensive coordination, detailed engineering, and costly mitigation, which translates to greater demands on a City's budget – and ultimately the taxpayers. Studies have shown that, over time, communities with open space areas and denser growth patterns actually have reduced property taxes. Lower property taxes in the long-term are the result of less development requiring fewer roads, schools, sewer and water infrastructure, and other municipal services.

1 Economic Benefits of Open Space. The Trust for Public Land.

2 Peter Pollack, "Confronting Sprawl in Boulder: Benefits and Pitfalls," LandLines, (Cambridge, MA: Lincoln Institute of Land Policy, January 1998).

3 Garvin and Berens, Urban Parks and Open Space, 27. (American LIVES, Inc. 1996 survey). See also June Fletcher, "Home Buyers are Shunning Developers' Pricey Extras," Wall Street Journal (November 21, 1997), B16. (Market Perspectives Inc. 1997 survey) and Homebuyers Survey Update, October 1998. (American LIVES, Inc. 1998 survey).

4 Mark Correll, et al. "The Effects of Greenbelts on Residential Property Values: Some Findings on the Political Economy of Open Space," Land Economics, May 1978. Cited in "Economic Impacts Protecting Rivers, Trails, and Greenway Corridors," 3rd Edition, National Park Service, 1992, 1-3.

5 National Park Service, Rivers, Trails and Conservation Assistance Program, "Economic Impacts of Protecting Rivers, Trails, and Greenway Corridors," 4th ed. (Washington, DC: National Park Service, 1995), 7-3.

6 John L. Crompton, Lisa L. Love, and Thomas A. More, "An Empirical Study of the Role of Recreation, Parks and Open Space in Companies' (Re) Location Decisions," Journal of Park and Recreation Administration (1997), 37-58.

7 The President's Commission on Americans Outdoors, Americans Outdoors: The Legacy, The Challenge, The Report of the President's Commission (Washington, DC: Island Press, 1987), 24.

8 Phyllis Myers, GreenSense, Vol.3, No.1 (Washington, DC: Phyllis Myers and Trust for Public Land, Spring 1997), 1.

Community Comparisons and Trends

Peer City Comparisons

As part of the visioning process, the planning team reviewed "Peer Cities" to place Henderson within a national context and to determine trends, planning strategies, and other attributes that might serve as ideas for the City to consider. Table 2-4 presents a comparison of open space and trail systems in cities considered to be "peer communities" to Henderson. Consideration was given to other communities that demonstrated characteristics similar to the City of Henderson, such as:

- Similar size
- Rapid growth
- Arid or semi-arid environment
- Adjacency to large tracts of federal or state public land.

Innovative programs or policies from several communities were also reviewed, including Scottsdale, Arizona; Albuquerque, New Mexico; and Colorado Springs, Colorado, as summarized below. Appendix A provides additional detail on implementation tools from these communities as they relate to the strategies presented in Chapter 4.

Community	Population	% Change in Population (1990 to 2000)	Acres of Municipal Open Space	Acres per 1,000 Population	Miles of Trails	Miles of Trail/ 1,000 Pop.
Peoria, AZ	129,632	111.8%	1,800	13.9	12	0.09
Henderson, NV	**220,236**	**169.4%**	**2,308**[1]	**9.8**	**25.8 (off-street only)**	**0.12**
Scottsdale, AZ	222,600	55.8%	11,363	51	200 miles of non-paved trails outside the Sonoran Desert Preserve, 62 miles of paved multi-use, and 15 miles of designated hiking trails w/in Preserve.	1.25
Colorado Springs, CO	377,006	27.5%	11,130	29.5	88 miles of designated hiking trails, 99.3 miles of urban multi-use trails.	0.50
Albuquerque, NM	471,856	15.9%	28,282	57.2	100 miles paved multi-use; 22 miles unpaved multi-use	0.26

Table 2-4. Peer Cities Comparison
[1]See Table 2-2 for open space property inventory

Scottsdale, Arizona

Vision

The growing need for public open space and recreational amenities are a key focus for the City of Scottdale, Arizona. The city is actively pursuing opportunities to acquire new open spaces, including retrofitting existing parks and facilities to accommodate the recreational needs of the future. Land developers often participate in the provision of public parks where new population bases are created as a result of their development plan. Currently, the city's open space and park system includes approximately 15,000 acres of developed and undeveloped areas. The vision is to create a 36,460 acre Sonoran Desert Preserve, with 125 miles of trails. Outside of the Preserve, 350 miles of primary, secondary, and neighborhood trails as well as 21 trailheads providing access into the Sonoran Preserve areas are planned. Additionally, the city plans to acquire 16,000 acres of adjacent state land (school land). Open space lands purchases and a community-wide trails system are funded through a series of voter-approved bond funds.

Innovative Programs and Policies

The Environmentally Sensitive Lands Ordinance (ESLO) is a set of zoning regulations adopted by the City Council to guide development throughout the desert and mountain areas of northern Scottsdale. The intent and purpose of the ESLO is to identify and protect environmentally sensitive lands in the City and to promote public health and safety by controlling development on these lands. The ordinance requires that a percentage of each property be permanently preserved as Natural Area Open Space and that specific environmental features be protected, including vegetation, washes, mountain ridges and peaks, to assure appropriate development. Application of the ESLO has resulted in the preservation of over 9,000 acres of Sonoran Desert open space.

Scottsdale has implemented a number of other programs designed to protect the natural features attributed to its Sonoran Desert location. One key component is a series of the Sensitive Design Principles. The Principles address such issues as:

- Building, signage, and site design;
- Site layout;
- Relationship to and protection of the natural landscape;
- Encouraging the use of alternative modes;
- Pedestrian amenities;
- Sustainable building practices; and
- Water conservation.

The Sensitive Design Program also outlines Scenic Corridor Design Guidelines. Applicable to key portions of six major roadways within Scottsdale, the Guidelines provide a mechanism to encourage the protection of the natural setting along these highly visible areas of the community.

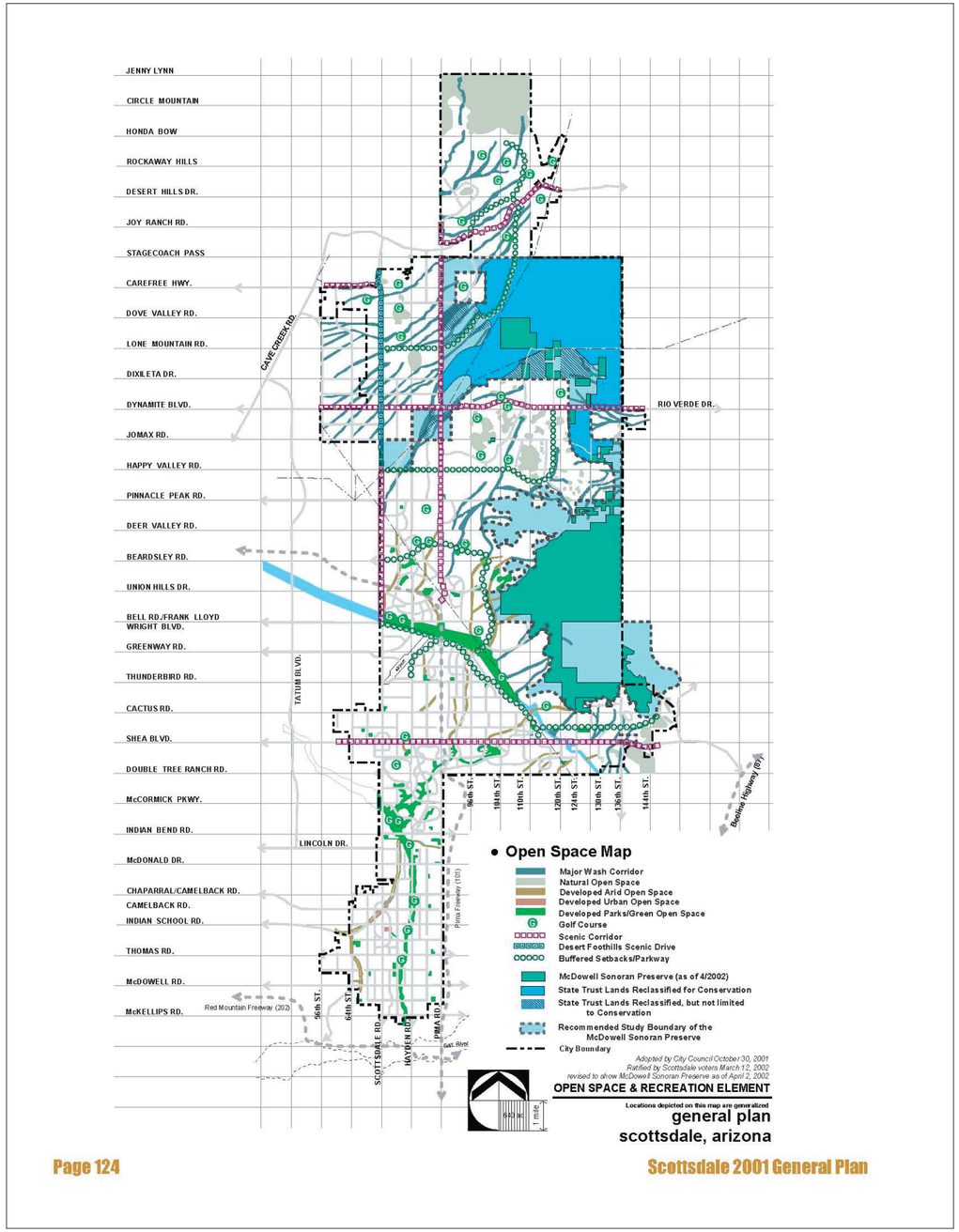


Figure 2-11. Open Space Map for Scottsdale, Arizona

Colorado Springs, Colorado

Vision

The Colorado Springs Parks, Recreation and Trails Master Plan defines policies and projects for the next 10 years that will provide a balanced system of conveniently located parks, interconnected urban trails, and multi-purpose recreational facilities. The Master Plan is based on an inventory of existing conditions as well as an analysis of community needs, including valuable direction provided by Colorado Springs residents through survey responses and comments made in a series of public workshops and other forums. In total, the urban trail system could include approximately 180 miles of trails by the year 2010 compared with the current approximate 65 miles of trails.

Innovative Programs and Policies

In 1997, voters in the City of Colorado Springs approved the creation of a sales and use tax increase of one tenth of one percent (0.10%) dedicated to conservation of open space and development of parks and trails through the Trails, Open Space, and Parks program (TOPS). TOPS seeks to acquire, develop, and preserve trails, parks and open space in order to create a legacy for future generations in the region. The language of the ordinance approved by the voters provides that a minimum of 60% of the available funding be directed to open space protection and a maximum of 20% to trails and a maximum of 20% to parks projects. The ordinance also provides that a citizens committee be established to advise the City Council on expenditure of available funding.

One of the goals of TOPS is to educate the public in preserving open spaces and improving parks and trails. TOPS open space projects conserve land on grasslands, bluffs and mesas, foothills, stream corridors and riparian areas. Colorado Springs is adjacent to National Forest, State Park, county, and other protected lands. Protecting open space areas within the city will help to connect the community with the surrounding protected lands.

Successes of the TOPS program include:

- The TOPS Program has provided $6,195,500 for 41 trail projects.
- Over the next 20 years, the City has planned for the development of approximately 153 miles of additional trails.
- Through creative partnerships, TOPS funds have leveraged an additional $1,963,700 in the form of trail grants and donations.
- TOPS Program has funded $6,311,950 for 19 park projects.
- TOPS funds have been used to leverage $2,414,050 from parks grants and donations.
- TOPS Program has funded $36,118,746 for 8 open space projects.
- TOPS funds have been used to leverage over $24.4 million matching funds in the form of open space grants and donations.
- Open space acres preserved through TOPS partnership and acquisition (since 1997) totals 4,013 acres.

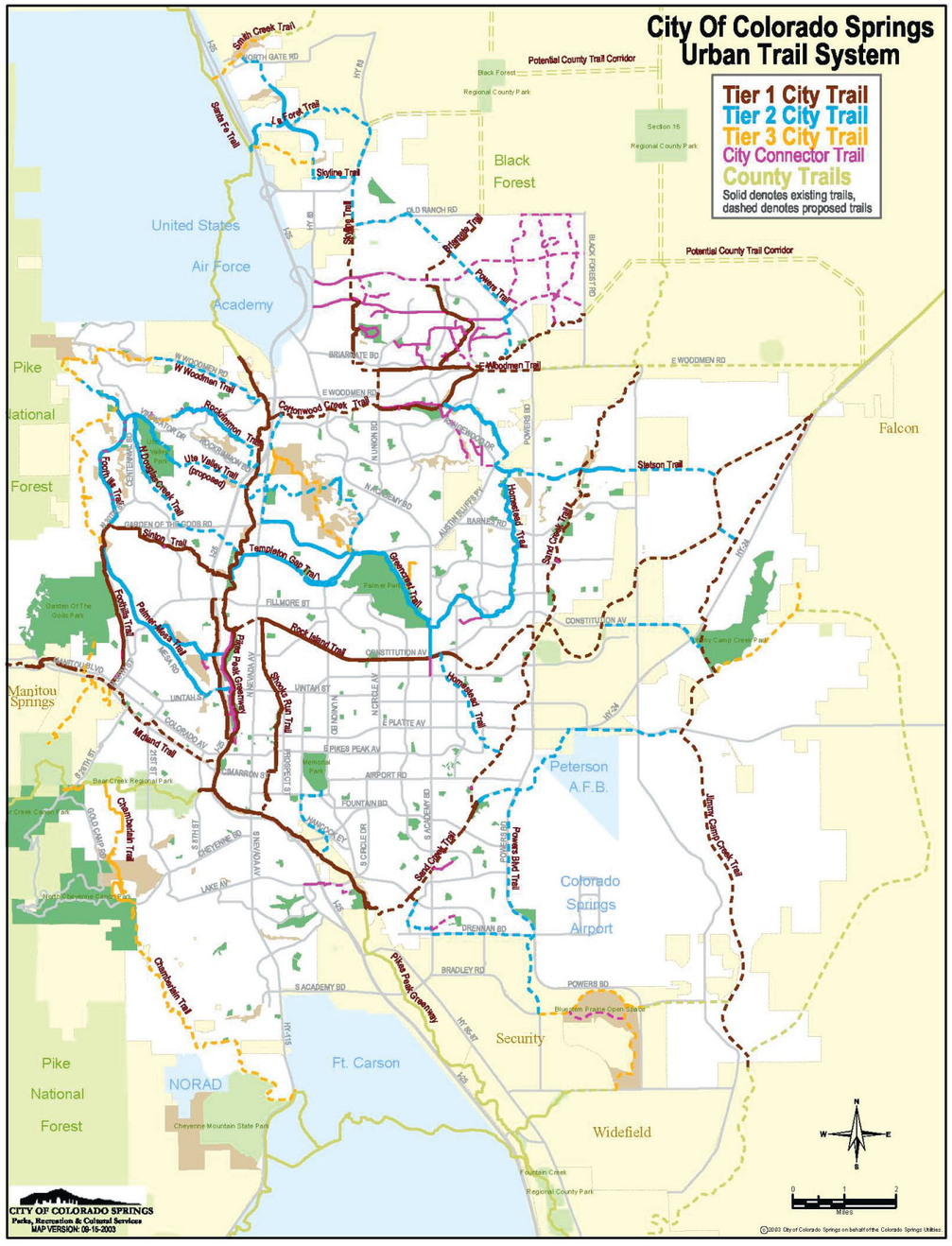


Figure 2-12. City of Colorado Springs Urban Trail System

Albuquerque, New Mexico

Vision

Albuquerque has established a permanent fund for open space protection which provides much of the support for management and some land restoration. The city council's Quality of Life Tax has generated funds for the purchase and protection of many acres of open space and the enhancement of existing facilities. Open Space acquisitions have been accomplished largely through funding with General Obligation Bonds, gross receipts taxes, and federal grants. Their 5-year goal is to acquire 40,000 acres.

Innovative Programs and Policies

Open Space preservation in Albuquerque has been achieved through a combination of efforts including the completion of a Major Public Open Space Facility Plan in 1999. The purpose of the plan was to establish guidelines for implementation of the Major Public Open Space Network goals outlined in the revised 1988 Albuquerque/Bernalillo County Comprehensive Plan. The Facility Plan also established more specific planning, land use and management policies for each major open space area. The City of Albuquerque Open Space Division was established in 1984 to manage almost 30,000 acres of City-owned open space and additional lands owned by other agencies. Acquisition and management were made possible through a variety of sources, including a permanent Open Space Trust Fund, gross receipts taxes, the City's general fund, and the City's capital implementation program.

The Open Space Alliance was created as a nonprofit group of volunteers (currently more than 500 members) that works with the City of Albuquerque Open Space Division to increase awareness of open space lands, promote conservation, acquisition and stewardship of open space lands, and assist in providing financial support for open space programs. Some of their sponsored programs include Get on the Bus, National Trails Day, and an Open Space newsletter.

Figure 2-13 shows the current Albuquerque Open Space network available to tourists and residents. The Open Space Master Plan, with comprehensive maps, is available by contacting the City of Albuquerque Open Space Division.

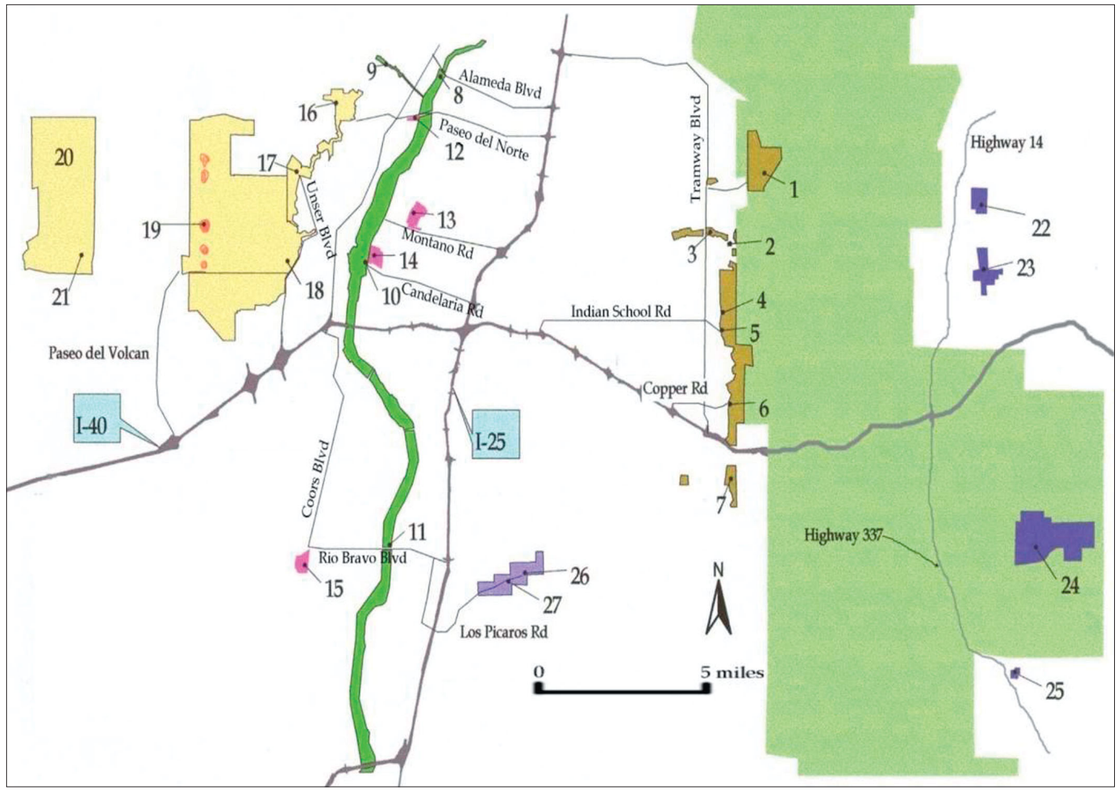


Figure 2-13. Open Space in Albuquerque, New Mexico

Population Trends

The City of Henderson is among the fastest growing cities in the nation. The population has increased more than 195% since 1990, an average of 1,000 new people per month in the last decade (Table 2-5). Over the past 10 years, Henderson has experienced more growth than in the prior 40 years combined. The City is expected to continue this tremendous growth.

The incorporated area within the City encompasses approximately 60,179 acres. Of this, more than half, or approximately 37,913 acres, remained vacant in 2003. The remaining 22,266 acres are developed for various urban uses, including recreational uses such as parks and golf courses. Approximately 2,350 acres are protected as open space as shown in Table 2-2, City Open Space Lands. Residents and City leadership have acknowledged the need to begin protecting the special places on vacant lands that make Henderson a desirable community.

Given a 2003 population of 220,236, a ratio can be calculated to estimate the rate at which these vacant lands will be converted to developed uses. A ratio of how many acres of land each additional thousand people will require can be estimated by dividing the amount of developed land (22,266 acres) by the current population expressed in thousands (220). The resulting ratio is 101 acres per each additional one-thousand people added to the City's population if the current development patterns continue into the future. This ratio is applied to the estimated population increase for the City in Table 2-6.

The City currently provides approximately 10.6 acres of protected open space per thousand population. If the community desired nothing more than to maintain this ratio, the City would have to add 2,759 acres of additional open space by the year 2030. If a more ambitious goal were identified, such as the average of the four "peer" communities shown in Table 2-4, which is 38 acres, this requirement would increase to 15,966 additional acres by the year 2030.

Similarly, based on the number of miles of trails that exist as of July 2005, the City provides approximately 0.12 miles of trails per thousand persons. If this ratio were maintained, the City would have to add 31 miles of trails by the year 2020. If a more ambitious goal were identified, such as the average of the four "peer" communities shown in Table 2-4, which is 0.53 miles per thousand persons, the City would need to build 138 miles of trail by the year 2020.

Year Population	Population	Population Increase	Percent Increase
1950	5,717	--	--
1960	12,525	6,808	119.1%
1970	16,400	3,875	30.9%
1980	23,276	6,876	41.9%
1990	64,942	41,666	179.0%
2000	175,406	110,464	170.1%

Table 2-5. Population: April 1, 1950 – 2000. Source: City of Henderson Economic and Demographic Overview, 2005.

Year	Population	Total additional land developed after 2003 (acres)	Remaining vacant land (acres)
2003	220,236	--	37,913
2005	246,222	2,625	35,288
2010	313,302	9,400	28,513
2020	417,443	19,918	17,995
2030	482,020	26,440	11,473

Table 2-6. Population and Vacant Land Projections. Source: City of Henderson Economic and Demographic Overview, 2005.

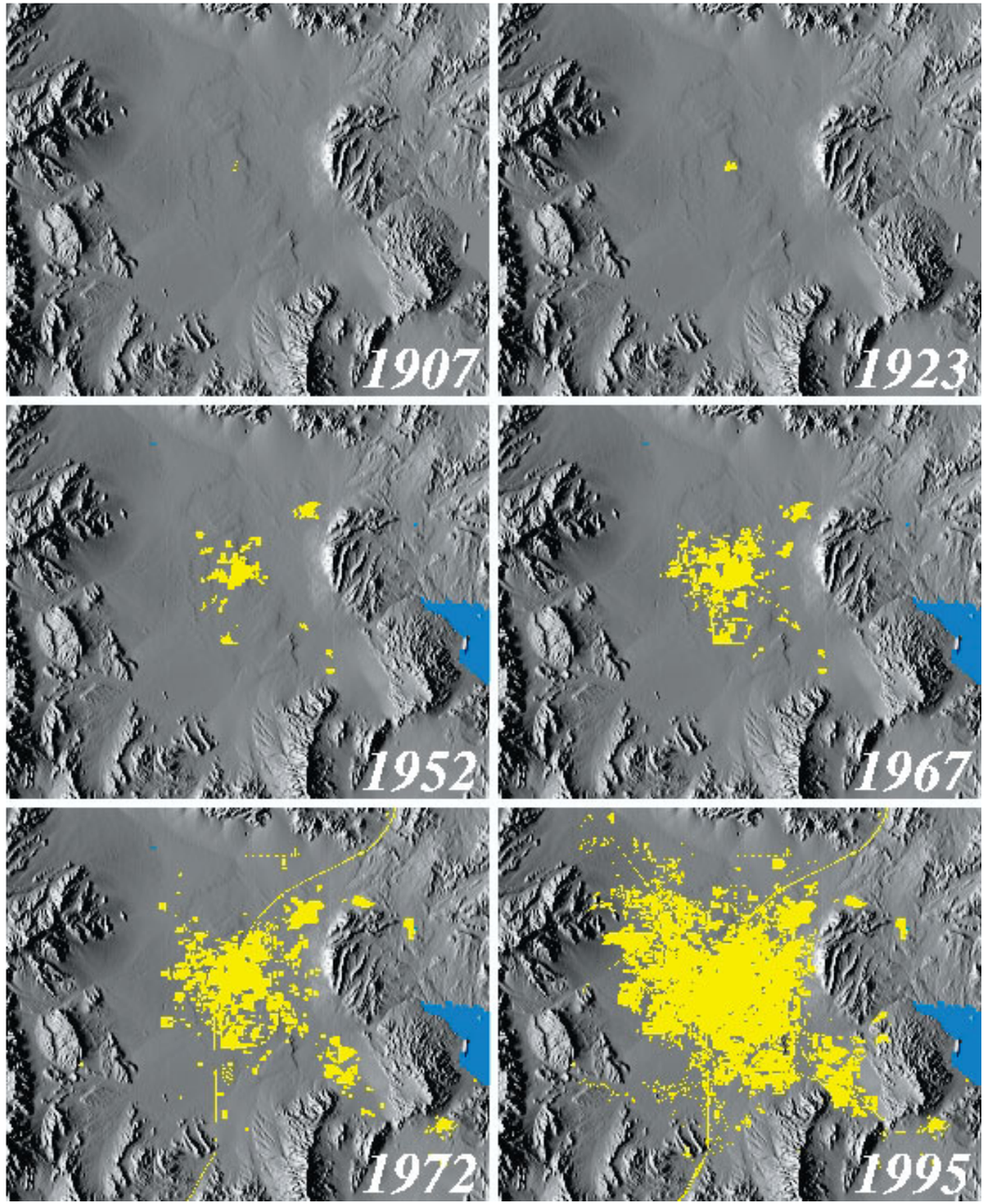


Figure 2-14. The USGS's built-up land data layer for Las Vegas provides a dramatic illustration of the spatial patterns and rates of change resulting from urban growth, 1907-1995 (Acevedo, et. al)

IV. PLANNING CONTEXT

The following table presents a synopsis of legislation and land use plans applicable to the City's open space and trails planning process. The most relevant plans and legislation are described in detail below.

Regional Plans

Southern Nevada Public Land Management Act (SNPLMA) of 1998

The SNPLMA has had major impacts in Southern Nevada on land availability and in providing additional funds for local, state, and federal facilities and services. The purpose of this Act is to provide for the orderly disposal of certain Federal lands in Clark County, Nevada, and to provide for the acquisition of environmentally sensitive lands in the State of Nevada. Moneys from the auction of BLM land within the Disposal Boundary must fund the following types of projects:

- The acquisition of environmentally sensitive land in the State of Nevada in accordance with priority given to lands located within Clark County.
- Capital improvements at the Lake Mead National Recreation Area, the Desert National Wildlife Refuge, the Red Rock Canyon National Conservation Area and other areas administered by the Bureau of Land Management in Clark County, and the Spring Mountains National Recreation Area.
- Development of a multi-species habitat conservation plan in Clark County, Nevada.
- Development of parks, trails, and natural areas in Clark County, Nevada, pursuant to a cooperative agreement with a unit of local government or regional government entity.
- Conservation initiatives on Federal lands in Clark County.
- Reimbursement of costs incurred by the local offices of the Bureau of Land Management in arranging sales or exchanges under this Act.

The SNPLMA gives local governments in the Las Vegas Valley first choice of the land in the Disposal Area for public purposes, such as parks, schools, police and fire stations. Land proposed for public recreation-related purposes are assessed at no cost in the auction process, while land obtained for other public purposes are leased for $2/acre or sold for $10/acre. In most cases, private non-profit organizations pay one-half of the fair market value. Any entity or individual may nominate a property for acquisition.

Sloan Canyon National Conservation Area

The Clark County Conservation of Public Land and Natural Resources Act of 2002 designated several wilderness areas including the North McCullough Wilderness, created the Sloan Canyon NCA, and amended the SNPLMA to allow up to 10% of moneys available to be used for conservation initiatives on Federal land in Clark County. The enabling legislation prescribed an emphasis on preservation and primitive uses at Sloan Canyon NCA as opposed to that of developed recreation opportunities at Red Rocks NCA west of Las Vegas. As there are few existing facilities and designated trail alignments, and the Sloan Canyon NCA receives relatively little use as a whole, the Resource Management Plan assigns Management Emphasis Areas (MEAs) for equestrian, trail, and HOV uses instead of specific alignments. A Visitors Center is proposed at the northwest entrance to Sloan Canyon, and may include restaurant, library, and research and interpretive facilities. Access to the Sloan Canyon Rock Art Site will most likely be limited to guided tours.

The BLM is currently reviewing public comments on the Draft RMP and will release a Final Resource Management Plan/Environmental Impact Statement in 2005 (see http://www.sloancanyon.org/). This draft will include specific locations of trailheads and the Visitor's Center which should be incorporated into this plan.

Planning Level	Related Land Use Plans and Legislation	Date
Federal	Transportation Equity Act for the 21st Century	1998
	Clark County Conservation of Public Land and Natural Resources Act	2002
State	State of Nevada Revised Statutes (regarding bicycles and pedestrians)	2003
	State of Nevada Statewide Bicycle Plan	--
Region	Southern Nevada Public Land Management Act (SNPLMA)	1998
	Sloan Canyon NCA Draft Resource Management Plan	2005
	Southern Nevada Regional Planning Coalition (SNRPC) Policy Plan	2001
	Regional Transportation Commission (RTC) Plan Update and Off-street Alternative Mode Study	2001 and 2004
	SNRPC Regional Trails Plan	2001
County	Clark County Multiple Species Habitat Conservation Plan	2000
	Clark County Environmentally Sensitive Lands Report	2002
	Clark County Flood Control District Master Plan Update	2002
	Clark County Comprehensive Plan	--
	Clark County Wetlands Park Trail Corridor and Design Guidelines	2002
Local/City	City of Henderson Comprehensive Plan	Update in process
	City of Henderson Parks and Recreation Department Five Year Plan	2000-2005
	Master Streets and Highways Plan	1991, rev. 2005
	Master Bicycle and Trails Plan Map	
	Henderson Development Code	--
	South Enterprise/West Henderson Land Use and Transportation Plan	2000

Table 2-7. Regulatory Context

Southern Nevada Regional Planning Coalition (SNRPC) Policy Plan (2001)

The Southern Nevada Regional Policy Plan addresses issues associated with rapid growth and improvements that can be made to upgrade the quality of life and allow for continued economic progress. It is intended to help guide local government leaders, businesses, and the Nevada Legislature in their efforts to maintain a strong economy while preserving and improving the quality of life and character of the Southern Nevada Region. The SNRPC Policy Plan serves to coordinate local plans within a regional framework. The SNRPC determines whether a local plan is in substantial conformance with the regional plan by commenting and negotiating with local municipalities.

In addition, the City of Henderson entered into an Agreement Regarding Conformity of City of Henderson Plan with the Southern Nevada Regional Policy Plan on November 21, 2002. The Agreement summarizes the ways in which the City is currently acting in furtherance of the Plan and sets out the actions that the City agrees to take to achieve and further conformity with the Regional Policy Plan. Per the Agreement, the City has agreed to work with the RPC and other local jurisdictions to facilitate the following efforts related to open space and trails planning:

- Creation of a regional trail plan with a regional funding base.
- Development of a standard definition of parks and open space.
- Encouragement of a change in BLM funding criteria for the Southern Nevada Public Lands Management Act Special Account to address areas with the most significant parks and open space needs.
- Development of model uniform standards for sensitive lands protection.

The City also agreed to the following additional steps related to open space and trails to further conformance with the Policy Plan:

- The City will work to complete a Master Trails Plan and an Open Space Master Plan.
- The City will consider amendments to its plans and land use regulations to protect historic public access to public lands.
- The City will identify locations of major environmentally sensitive areas, and will make efforts to develop policies and practices such as setback requirements to protect such areas.
- The City will work to improve communications among various departments responsible for flood control facility design and park and recreation planning to encourage multiple use of flood facilities.
- The City will consider revisions to its land use regulations to address the use of flood control facilities and utility corridors for trails and other related uses.

Regional Transportation Commission Off-Street Alternative Mode Study

The Bicycle/Pedestrian Element (BPE) of the Regional Transportation Plan provides guidance for the long term development of bicycle and pedestrian facilities in Clark County. The BPE addresses a broad range of improvements to encourage bicycling and walking as viable alternatives to the automobile.

The Regional Transportation Committee (RTC) and the member entities recognize the need to provide a well connected and functional non-motorized network of on and off-street bicycle facilities within the metropolitan and outlying areas. Improvements to the existing non-motorized network are needed to better accommodate existing users and increase the percentage of commuters who use non-motorized modes. To better develop a viable BPE, the RTC initiated the Alternative Mode Master Transportation Plan (AMTP) in 2001. The goals of the AMTP include developing a comprehensive bicycle system providing convenient access to origins and destinations throughout the entire community; taking advantage of available space within existing wash, freeway, and utility corridors to provide shared use paths, open space, park activities, and equestrian trails; and providing appropriate facilities for pedestrian and bicycle travel as part of the motorized vehicle circulation system (Figure 2-15.)

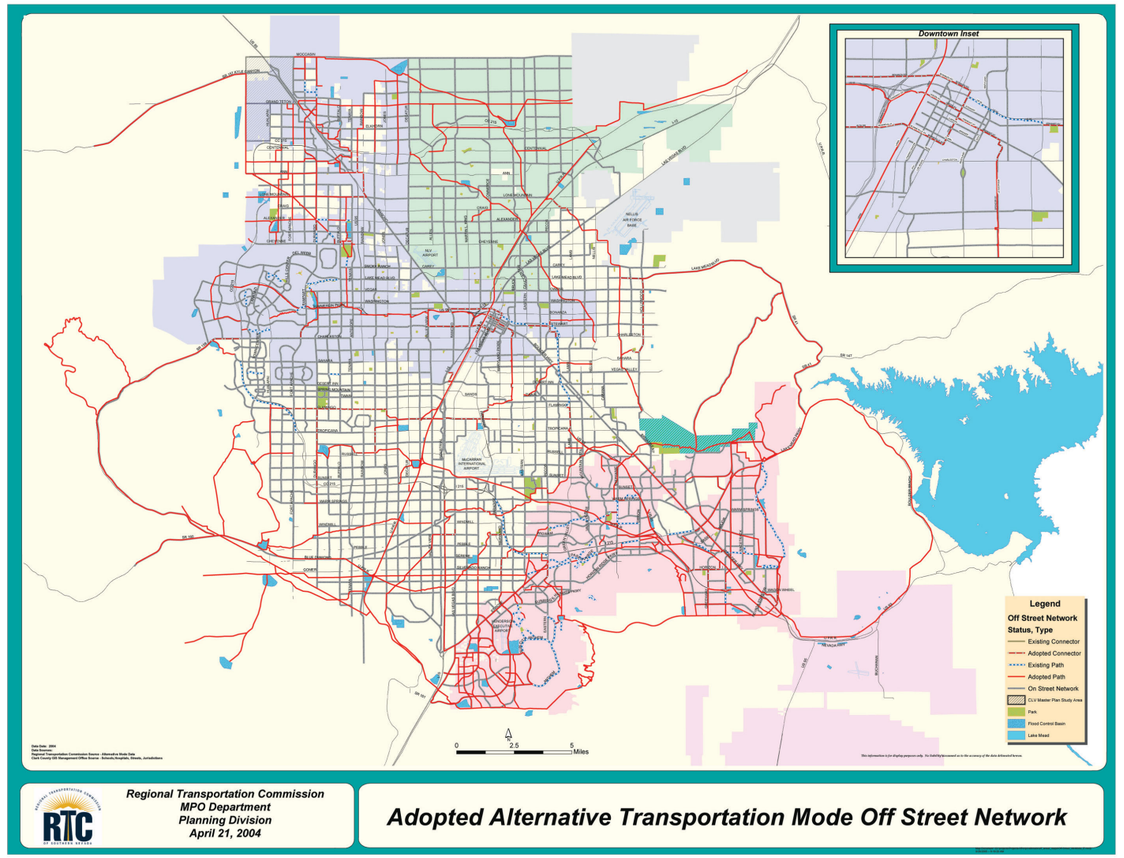


Table 2-15. RTC Off-Street Alternative Mode Map

SNRPC Regional Trails Plan

The Las Vegas Valley will continue to grow and face the problems of mobility and continued pressure on recreational facilities, both of which can be addressed to a significant extent with trails. The goal of this cooperative planning effort is to recognize and support the continued development of an interconnected regional trail system which provides an alternative mode of transportation.

The Las Vegas Valley Primary Trail System Map was consulted as the City developed primary, secondary and other trails plans to minimize the chance of City trail planning efforts straying from the concept of an interconnected regional system. Additionally, the Las Vegas Valley Primary Trail System Map should be consulted as part of any related transportation study (Figure 2-16). Like the RTC Off-Street Alternative Mode Map, Las Vegas Valley Primary Trail System Map will most likely require amendments as it is not the purpose of this map to set an intractable plan in place, but to strive for the development of an interconnected regional trail system.

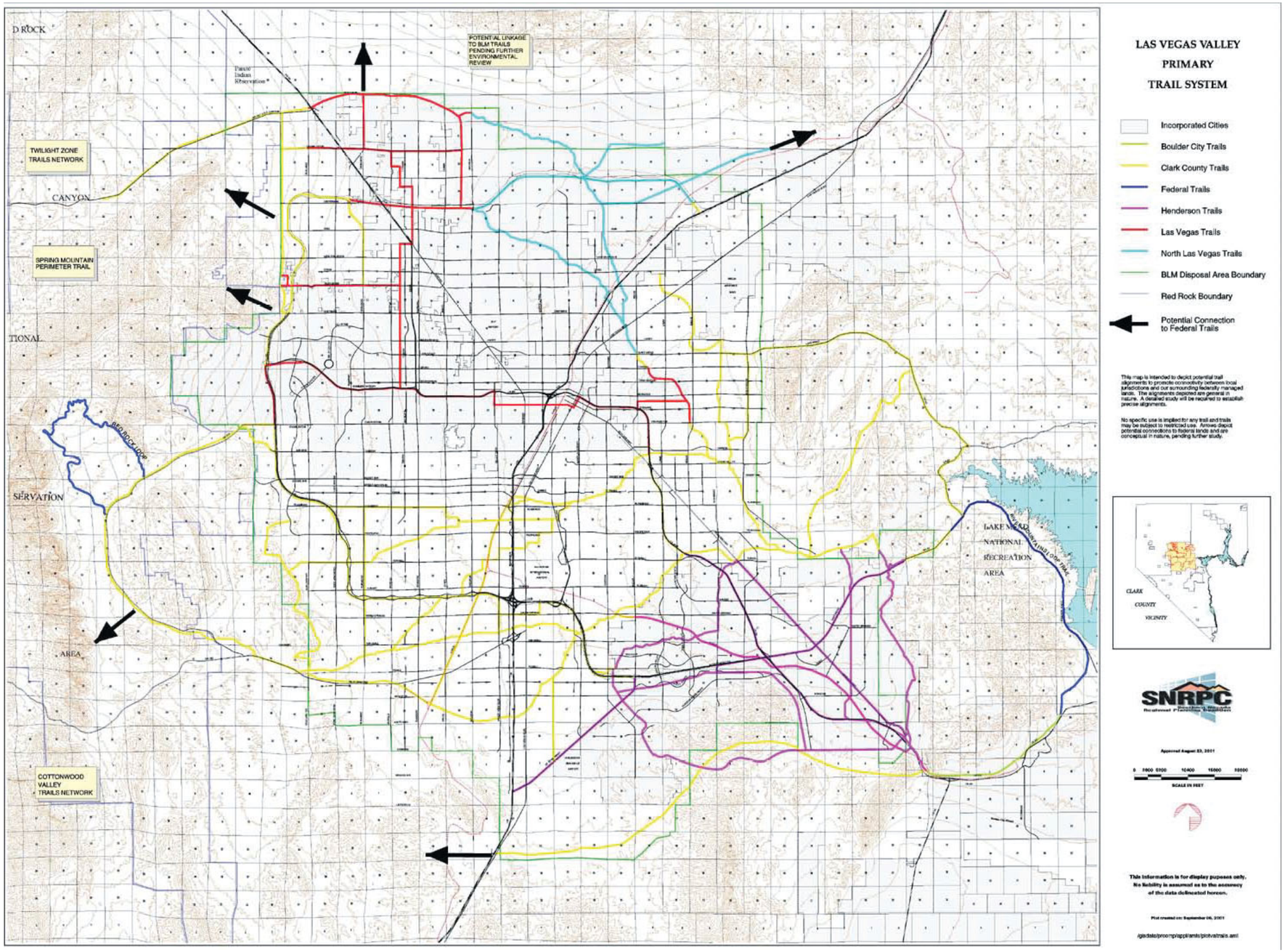

POTENTIAL LINKAGE TO BLM TRAILS PENDING FURTHER ENVIRONMENTAL REVIEW
TWILIGHT ZONE TRAILS NETWORK
SPRING MOUNTAIN PERIMETER TRAIL
COTTONWOOD VALLEY TRAILS NETWORK
LAKE MEAD NATIONAL RECREATION AREA
LAS VEGAS VALLEY PRIMARY TRAIL SYSTEM
Incorporated Cities
Boulder City Trails
Clark County Trails
Federal Trails
Henderson Trails
Las Vegas Trails
North Las Vegas Trails
BLM Disposal Area Boundary
Red Rock Boundary
Potential Connection to Federal Trails
This map is intended to depict potential trail alignments to provide connectivity between local jurisdictions and our surrounding federally managed lands. The alignments depicted are general in nature. A detailed study will be required to establish precise alignments.
No specific use is implied for any trail and trails may be subject to restricted use. Arrows depict potential connections to federal lands and are conceptual in nature, pending further study.
CLARK COUNTY VICINITY
SNRPC
This information is for display purposes only. No liability is assumed as to the accuracy of the data delineated hereon.

Table 2-16. SNRPC Las Vegas Valley Primary Trail System

County Plans

Clark County Multiple Species Habitat Conservation Plan (MSHCP)

The MSHCP (Phase I) was developed by the Public Implementation and Monitoring Committee in conjunction with Clark County to encourage proactive habitat conservation planning in Southern Nevada. The Habitat Conservation Plan supersedes an earlier plan, the Desert Conservation Plan, which focused only on the federally listed desert tortoise. This program creates the opportunity to expend funds on seventy-eight (78) species of plants and animals, including the desert tortoise. The MSHCP promises to balance environmental integrity and economic prosperity in Clark County by reducing the likelihood of future Federal listings by ensuring the well being of these species and the ecosystems in which they reside. Phase II of the MSHCP will bring coverage for riparian and aquatic species residing in and around the Muddy and Virgin Rivers.

The plan outlines 650 specific conservation measures. One of the principal conservation benefits of the MSHCP, in addition to substantial funding for conservation actions, is the Adaptive Management Process (AMP). This process provides a means for coordination of conservation actions among the land managers and resource agencies in Clark County at the ecosystem and community level. The AMP will assess the effectiveness of the Plan's conservation actions over the course of the 30-year program and provide guidance for conservation efforts.

The MSHCP and the resultant Section 10(a) Permit are designed to allow the incidental take of Covered Species within certain parameters and to reduce the likelihood of the listing of additional species located in Clark County as threatened or endangered. The key purpose of the MSHCP is to achieve a balance between long-term conservation and recovery of the diversity of habitats and native species of plants and animals and the beneficial use of land in order to promote the economy, health, wellbeing, and culture of the growing population of Clark County. Additionally, the MSHCP has been designed to provide substantial recovery and conservation benefits to species and ecosystems in Clark County and to reduce the regulatory burden of ESA compliance for all affected participants. Refer to Figure 2-5, Multi-species Habitat Conservation Plan.

Clark County Comprehensive Plan Policies

Numerous County policies outline the management of open space in Clark County. The Clark County Comprehensive Plan contains policies relating to federal lands, conservation, trails and open space acquisition, environmental resource opportunities, development, operation and maintenance, intergovernmental coordination, and community involvement and marketing. Some of the most relevant policies are shown in the following sidebar.

The County is in the process of completing a Trails Element to the Clark County Comprehensive Plan to establish policies and provides direction relative to developing trails within unincorporated Clark County, as well as a Trails Design Manual illustrating basic design and construction standards to build trails, to accommodate trail users, and to minimize maintenance and environmental impacts. These draft documents are anticipated to be adopted in Fall 2005, and were consulted throughout the City of Henderson Open Space and Trails planning process.

RELEVANT COUNTY POLICIES

- CON 2.1 Encourage preservation of unique geologic and mineral formations for educational, scientific and other public purposes.
- CON 2.15 Ensure proper design considerations for development in areas of slopes 12% or greater.
- CON 2.16 Encourage transitional development to buffer environmentally sensitive areas from more intense uses.
- CON 2.17 Continue to use Community District 6* as a mechanism to preserve open space and conservation areas within Clark County.

  *Community District 6 (CD6) is defined as an open space and conservation district. This classification identifies areas of limited development potential. The purpose of the district is to preserve areas for open space or recreational purposes and to protect public health and safety. Areas designated CD6 may have some extremely low density residential uses but should not be considered for future commercial or industrial uses. Lands having slopes of 15% or that are federally reserved area considered extensions of CD6 unless otherwise noted within the area's respective land use guide. Areas within Clark County considered sensitive are listed below with management authority and total acreage.
- CON 2.18 Continue to implement the Clark County Wetlands Park Master Plan as a mechanism to preserve open space and conservation areas within Clark County.
- CON 2.20 Encourage preservation and protection of washes and waterways.
- TOS 1.1 Identification and acquisition of trail corridors and open space should occur now to serve the future needs of the County.
- TOS 2.1 Trail facilities and open space areas should be designed and managed to enhance and protect natural resource values.
- TOS 2.2 Public lands outside of the BLM urban land disposal boundary should remain in public ownership and be managed as open space recreational areas.
- TOS 4.1 Trails and Open Space development should be accelerated and managed to ensure natural resource protection, quality recreation experiences and public safety.
- TOS 6.1 Encourage partnerships with civic and neighborhood groups to facilitate trails development.
- TOS 6.2 Promote marketing and community ownership strategies to foster community support for trails and open space development.

- Trails and Open Space (TOS), Conservation (CON).

Clark County Community Growth Initiative and Task Force

The Clark County Growth Intiative was intended to create a forum to discuss the benefits and challenges that come with being the fastest-growing community in the United States. As part of the initiative, the commissioners formed a Community Growth Task Force to study growth matters and engage in public debate. The Task Force addressed growth issues including natural resource conservation and coordination of processes among jurisdictions. As a result, the Clark County Growth Task Force Report was adopted by the Board of County Commissioners during April 2005 and includes the following notable strategies:

- Expand and encourage joint-use of public facilities in Clark County. Work with local jurisdictions to design for more accessible recreational space and resource enhancements.
- We also need to look at flood control systems and where they lend themselves to joint recreational and parks opportunities.
- Collaborate with the Regional Flood Control District to coordinate the development of appropriate flood control systems for parks and recreational opportunities.

Clark County Wetlands Park Trail Corridor and Guidelines Plan

Clark County Parks and Community Services Department prepared the Clark County Wetlands Park Trail Corridors and Guidelines Plan to establish a set of trail guidelines and corridors for the Clark County Wetlands Park (Figure 2-18). The plan provides a comprehensive trail master plan, including corridors and facilities for bicyclists, pedestrians, and equestrians. Designs detail the recommended trail width, trail right of way, maximum slopes, shoulder clearing height and width, and surface construction materials. Many of the lessons learned in implementing this plan should be applied to the City of Henderson's growing trails system.

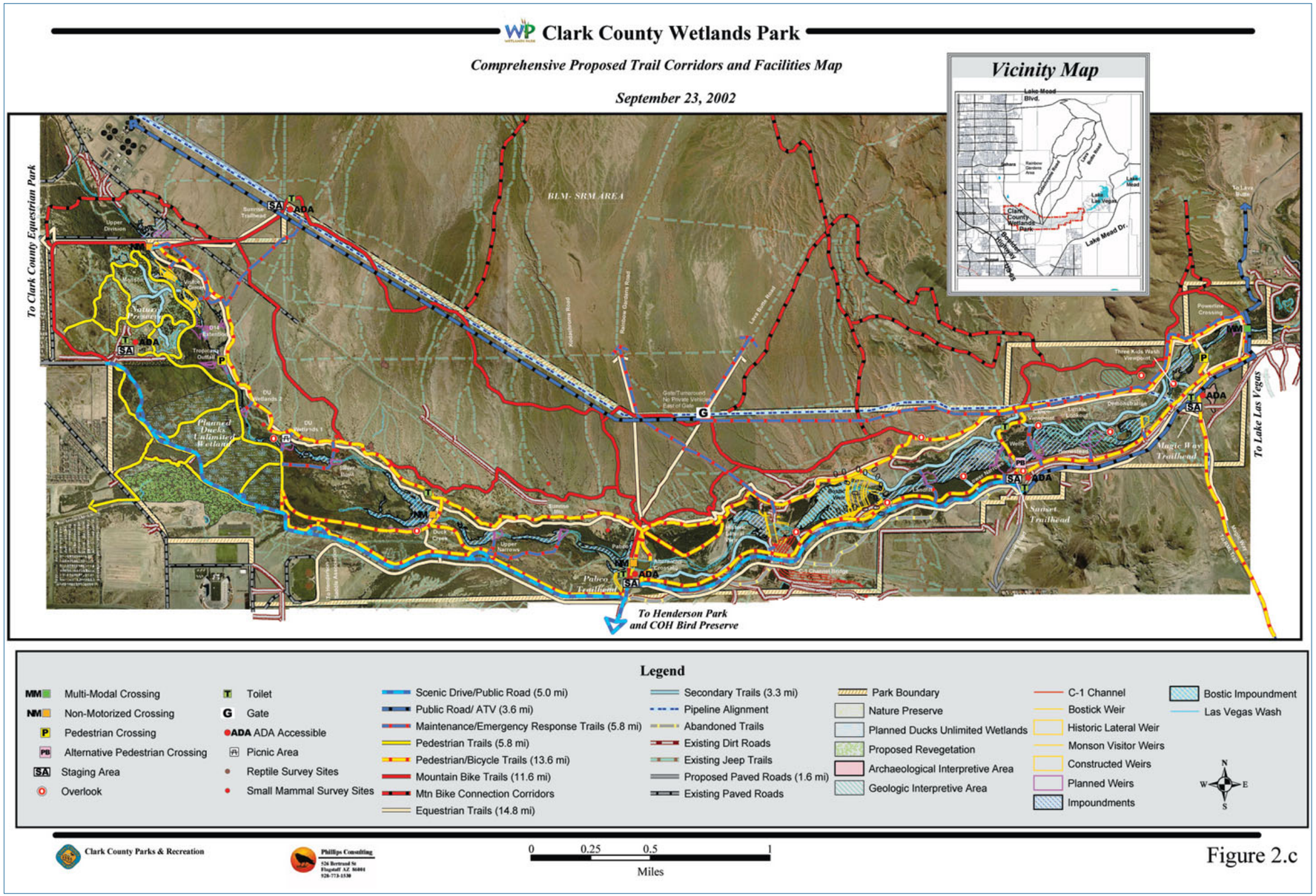


Figure 2-18. Clark County Wetlands Park Comprehensive Proposed Trail Corridors and Facilities Map

City and Local Regulations

City of Henderson Comprehensive Plan

The City of Henderson is in the process of updating its existing Comprehensive Plan scheduled for completion in Fall 2005. The Open Space Plan is an element of the city's Comprehensive Plan. The Comprehensive Plan references this plan for detailed policies and plans that will be updated periodically. The Comprehensive Plan contains some open space policies that are consistent with this plan, but at a more broad and general level. The city is updating the Comprehensive Plan in 2005; it will be complete in early 2006.

City of Henderson Parks and Recreation Department Five Year Plan (2000-2005)

The City's Comprehensive Plan provides the basic framework for the City's growth, and the Parks and Recreation Element describes in detail the planning, needs assessment, resources, and standards used to develop new facilities and programs. As an implementation plan, the Parks and Recreation Five Year Plan establishes a vision, mission, a value statement, and policy statements that identify the key short-term goals of the Department. Notable policies are listed below:

Open Space and Natural Resources

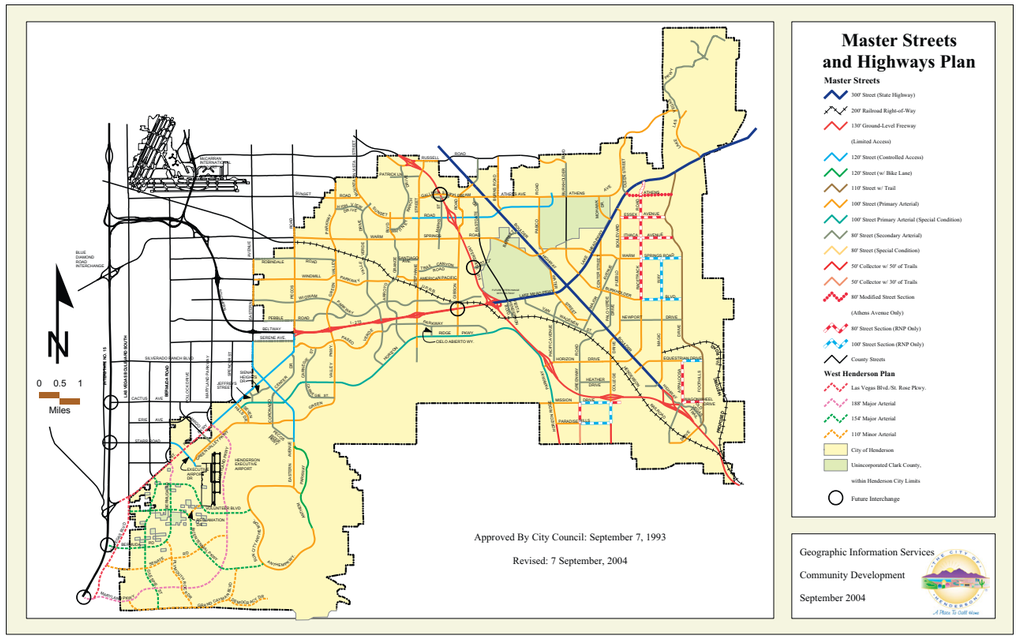
- Significant open space should be retained and preserved for future generations.
- Open space should be encouraged in developing areas in the form of greenbelts that delineate neighborhoods and create cohesive, safe neighborhoods.
- Continue to secure additional natural resources by working with various public agencies including the Bureau of Land Management and the County Flood Control District as well as local developers.
- Existing natural drainage-ways should, as much as possible, be preserved in their natural state and be designed for use as outdoor recreation facilities.
- Community and neighborhood open space should be provided for by linkage to a greater system of regional open space through the continued development of the master trails system.
- Land subject to severe environmental hazards, including geologic or hydrologic constraints or poor soils, should be preserved as open space.
- The pristine and undeveloped resources of the surrounding mountains should be preserved. Open space should be planned so that the plant materials, wildlife, geologic formations, and visual beauty are preserved.
- Views, visual corridors, and visual linkages should be preserved for the developed areas out of the surrounding mountains and open space areas.

Trails

- Focus the initial construction efforts toward linking major parts of the trail together as opposed to extending the trail system.
- Partner with other agencies including the county, state, and federal agencies as well as the Flood Control Districts to establish corridors for trail extension.
- Look for long corridors through the City, such as the railroad, to provide a linkage of the trail system.

Master Streets and Highways Plan

The Master Streets and Highways Plan was approved in August 1991 (Figure 2-19). The most recent revision was approved in February 2005. This Plan indicates the locations of all existing and planned roadways in Henderson and the associated street cross sections, including bike lane, sidewalk, and shared use path cross-sections.



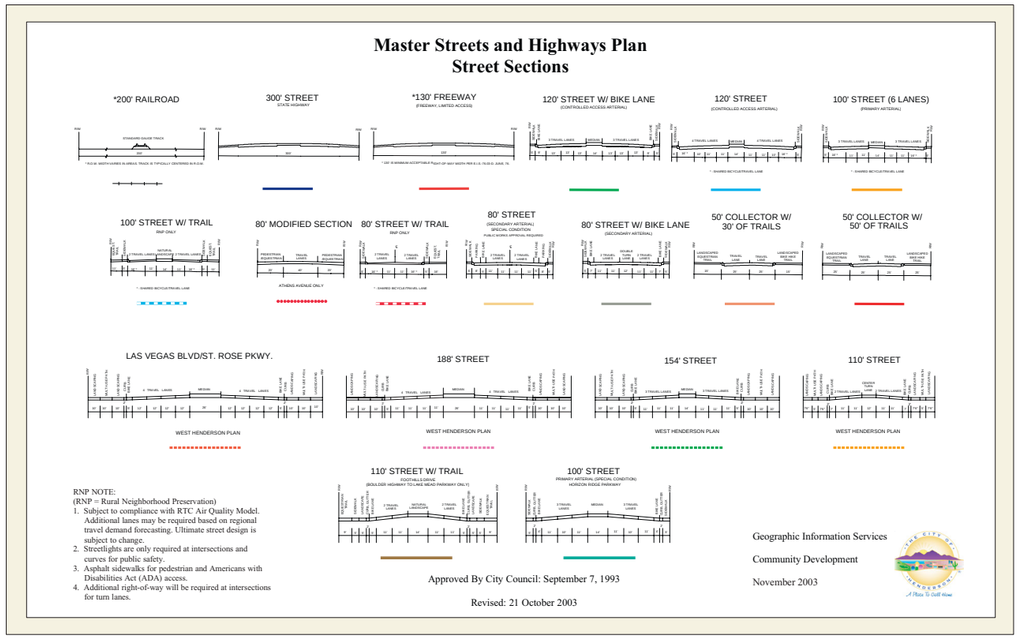

Master Streets and Highways Plan
Street Sections
*200' RAILROAD
300' STREET
*130' FREEWAY
120' STREET W/ BIKE LANE
120' STREET
100' STREET (6 LANES)
100' STREET W/ TRAIL
80' MODIFIED SECTION
80' STREET W/ TRAIL
80' STREET
80' STREET W/ BIKE LANE
50' COLLECTOR W/ 30' OF TRAILS
50' COLLECTOR W/ 50' OF TRAILS
LAS VEGAS BLVD/ST. ROSE PKWY.
188' STREET
154' STREET
110' STREET
110' STREET W/ TRAIL
100' STREET
RNP NOTE:
(RNP = Rural Neighborhood Preservation)
1. Subject to compliance with RTC Air Quality Model. Additional lanes may be required based on regional travel demand forecasting. Ultimate street design is subject to change.
2. Streetlights are only required at intersections and curves for public safety.
3. Asphalt sidewalks for pedestrian and Americans with Disabilities Act (ADA) access.
4. Additional right-of-way will be required at intersections for turn lanes.
Approved By City Council: September 7, 1993
Revised: 21 October 2003
Geographic Information Services
Community Development
November 2003

Figure 2-19. Master Streets and Highways Plan and Street Cross-Sections

Master Bicycle and Trails Plan

The City's system of shared-use paths, bike lanes, and bike routes serves both transportation and recreation purposes, and is an important asset to the community. The Master Bicycle and Trails Plan (map adopted only) was prepared in tandem with the Master Bicycle and Pedestrian Facilities Plan which was not completed (Figure 2-20). It should be noted that the plan's emphasis was on transportation and mobility rather than recreational uses. Thus, it was not intended to comprehensively address hiking, mountain biking, and equestrian facilities.

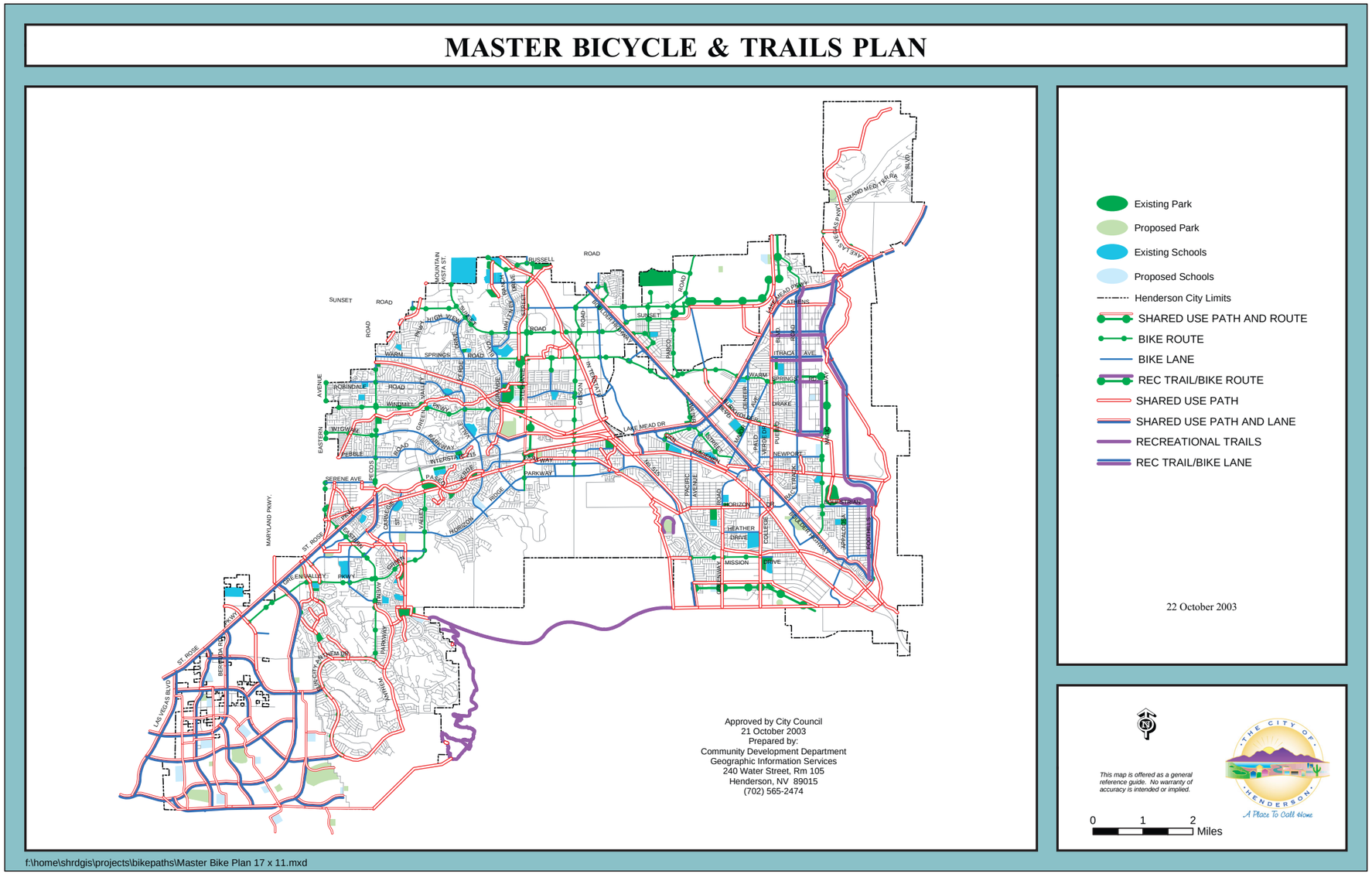


Figure 2-20. Master Bicycle and Trails Plan

Henderson Development Code

Henderson's Development Code provides two regulatory mechanisms that are available to protect sensitive lands: (1) the Sensitive Land Overlay and (2) the Hillside Overlay. Neither code is activated due to the actual existence of a natural resource, such as steep slopes. Rather the overlay district standards and geographic extents are invoked by the City Council.

1. Sensitive Land Overlay (§19.5.10)

The Henderson Development Code (the "Code") currently contains a "Sensitive Lands Overlay District," which is not currently being utilized in the City. The standards for this district supersede all other regulations applicable to the underlying land. The District regulations are invoked on a case-by-case basis by the City Council "upon its own initiative or upon the recommendation of the Planning Commission." The City Council shall designate land as "Sensitive Land" and "enumerate the significant natural and visual attributes justifying such designation and apply standards, uses and densities pursuant to the procedures set forth in this section."

2. Hillside Overlay (§19.5.9)

The Code also regulates land development to protect mountains, foothills, and mesas that exhibit steep slopes and unstable rock with a Hillside Overlay. Like the Sensitive Land Overlay, this Overlay is invoked by the City Council, Planning Commission, or by petition of property owners. If the City initiates the designation, the owner of property containing slopes of 15% or greater shall be subject to development standards contained in this section which reduces development potential as steep slopes increase. The Overlay allows for the transfer of development densities/site disturbance between lands within and outside a sensitive ridgeline setback (100' from designated ridgeline). Based on the current zoning map, certain areas have been designated through the Hillside Overlay as sensitive ridgelines and steep hillsides (Black Mountain and Whitney Mesa, for instance).

V. OPPORTUNITIES AND CONSTRAINTS SUMMARY

From the review of existing conditions and issues, the planning team held work sessions with City Council, Planning Commission, Parks and Recreation Board, Open Space Plan Advisory Committee, Technical Advisory Committee and the public to identify potential opportunities and constraints. Their comments are captured in Table 2-7 and Figure 2-21, which summarize these open space and trail opportunities and constraints. Although the opportunities and constraints are listed side-by-side, they are not meant to be paired with one another. These ideas were used in refining an Open Space and Trails Framework, which is presented in the following chapter.

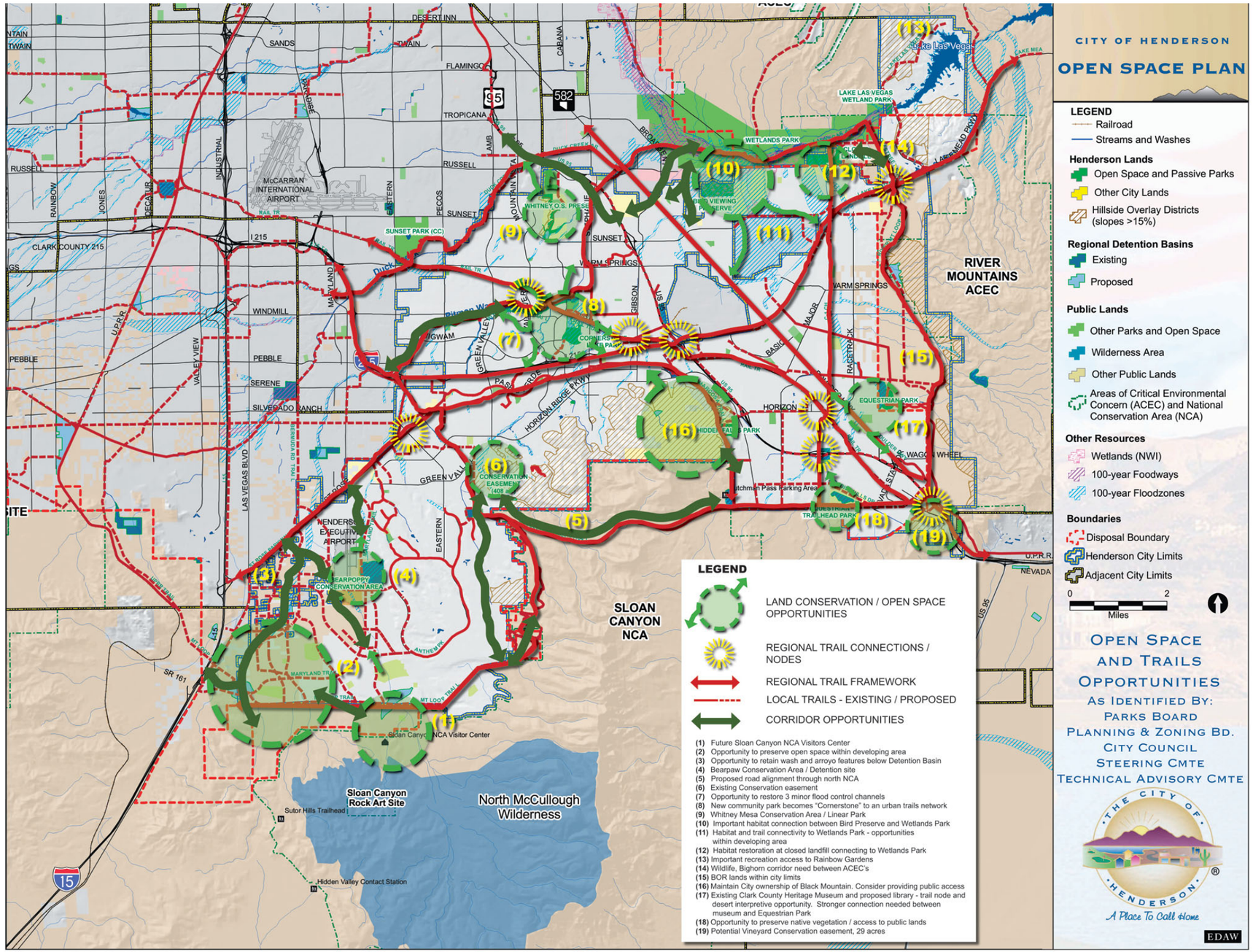


Figure 2-21. Open Space and Trails Opportunities

OPEN SPACE OPPORTUNITIES

Environmentally Sensitive Lands

Among other projects, moneys from the auction of BLM land within the Disposal Boundary can fund "the acquisition of environmentally sensitive land in the State of Nevada in accordance with priority given to lands located within Clark County." SNPLMA funds can also be used for the development of parks, trails, and natural areas in Clark County, Nevada. When asked, "what natural 'special places' define Henderson?" interviewees indicated that most special places had already been compromised due to urban growth. However, some key locations were identified for consideration:

- Expanding the Bird Preserve
- Expanding the Wetlands Park to connect to neighborhoods in Henderson
- Expanding the Wetlands Park to include the old landfill and adjacent properties
- Expanding trails, facilities, and aesthetic features around the newly-acquired Hidden Falls park site.
- Creating a rural environment around the Clark County Heritage Museum on Boulder Highway
- Maintaining a more passive environment around Cornerstone Lake.
- Using Cornerstone Redevelopment Area as a recreational corridor connecting trails from I-215 to the UPRR to the High School, and finally to Pitman Wash corridor.
- Increasing connectivity for NW neighborhoods to Sunset Park along UPRR
- North-south open space and trails corridor connecting BLM lands to Mission Hills Parks through the proposed Equestrian Trailhead Park.
- Conserving lands in the Lake Las Vegas / River Mountains Loop Trail area to enhance wildlife movement, esp. Bighorn Sheep.

Conservation Easements

Conservation easements are a restriction placed on a piece of private property to protect specific resources. The easement is either voluntarily donated or sold by the landowner to another party. This type of easement can benefit both the public and the property owner because the land and its resources can be protected and the property remains in private ownership. In addition, the property owner may be eligible for substantial tax benefits resulting from the conservation easement itself. Conservation easements are among the fastest growing methods of land preservation in the United States today

They can be used to:

- Protect natural habitat from destruction by conversion to other uses such as subdivision and development.
- Protect open space of varying kinds from development or other disturbance.
- Protect natural habitat from destruction by intensive agriculture.
- Protect water resources by limiting disturbance of lands in the watershed.
- Provide for public use and access, such as through trail easements.

Three conservation easements are in-process to protect lands with steep slopes in highly visible areas:

- 408-acre Open Space Covenant and Permanent Conservation Easement east of Anthem
- 29-acre Conservation Easement at the Vineyards (southside of Railroad Pass).
- And a private Conservation Easement at Lake Las Vegas.

Although the City and County have not utilized conservation easements extensively in the past, conservation easements can allow the City to work effectively with private land owners in a win-win situation to protect priority conservation sites.

Contaminated Lands

Some contaminated lands in the City of Henderson that are unsuitable for more intense uses may be safe to use for passive recreation, wildlife habitats, etc. These include:

- Cornerstone Park Lake
- Old Landfill
- Under-utilized, revegetated industrial lands

OPEN SPACE CONSTRAINTS

Regional-scale Conservation

Due to the high real estate costs and fragmented ownership patterns within the urban area of Henderson, limited opportunities exist for large-scale open space conservation utilizing private land. Portions of the most notable topographical landmarks (River Mountains, Rainbow Gardens, McCullough Mountains, Las Vegas Wash) are already protected by the BLM or County. The challenge will be to buffer these edges and maintain public access.

The BLM disposal process can potentially provide an excellent opportunity to designate sensitive lands prior to disposal, or transfer them to land trusts in order for sensitive lands to be protected in perpetuity.

Geographic Constraints

As a result of the MSHCP, conservation efforts are focused on Intensely Managed Areas (IMAs) and Less Intensively Managed Areas (LIMAs) beyond the disposal area boundary. As a result, there is little political or funding support for wildlife conservation within urban areas despite public values to the contrary.

Desert Vandalism

Illegal dumping, intensive off-road vehicle use, and shooting degrades the scenic integrity of the desert, leading recreationists to avoid using these areas and a de-appreciation by the public of the desert as a whole. If these activities are not controlled, as the City expands, additional lands will be compromised including those identified as priority conservation sites. For example, off-road vehicle use in the Equestrian Detention Basin may limit efforts to develop it into a trailhead.

Multi-Use Constraints

There are no dedicated funding sources that can provide for recreational or aesthetic improvements to existing flood control facilities. The CCFCD does not fund, maintain, or repair any multi-use facilities associated with flood structures, with the exception of debris clean-up. Some detention basins and channels in Henderson were designed to address multi-uses and aesthetics but have experienced higher than anticipated maintenance costs and other problems.

Procedural Constraints

Conflicting agendas and a lack of communication between agencies and within the City government complicates long-range open space planning efforts.

Private Land Conservation

Many people expressed legal and political concerns about "takings" or identifying privately owned parcels for acquisition. Due to a recent change in the Nevada State Law, a property owner can sue a municipality for an illegal taking. Rezoning can also result in a taking in certain instances. In general, however, the "hands-off private land" perception that is much greater than the legal reality. If private land conservation is not attempted (i.e., collaboratively educating and working with private landowners to conserve their sensitive lands), it will become even more important that public land remains public as few other opportunities will exist.

Open Space Dedications

While the "turn-key" and parks dedication requirements have been very effective in acquiring recreational facilities for residents as the City grows, requiring additional dedications of open space from developers may encounter resistance. Also, a system must be designed to clarify the difference between parks and open space so that developers do not count green spaces, medians, neighborhood buffers, etc. as parks.

Table 2-8. Open Space and Trails: Opportunities and Constraints continued

TRAILS OPPORTUNITIES

Multi-Use Opportunities

Most flood control channels have maintenance roads (typically 12-15' width) that may be suitable for pedestrian and biking access. A pedestrian separation device separating the channel from the road is required (typically a 6' chain link fence). The pedestrian separation device must be designed and installed in a manner that does not impair normal operations and maintenance activities, or emergency response and rescue activities.

Connectivity

The City can connect to locations of Clark County Wetlands Park, NCA trailheads, the Sloan Canyon Visitors Center, and the Rivers Mountain Loop Trail, and other existing or planned facilities.
Other Trail Opportunities include:

- Existing and Proposed Trails
- Railroads
- Ditches/Washes
- Powerlines
- Roads
- Proposed Transportation Improvements (Foothills, McCullough Drive, West Henderson Loop)
- Light Rail or BRT Location

TRAILS CONSTRAINTS

Retrofitting Trails

Retrofitting trails onto existing infrastructure, flood control facilities, and private property encounter more resistance and high costs than if trails were integrated into the original development.

Opposition from owners adjacent to trails, especially when trails are located between flood control channels and residential backyards.

Connectivity

Where maintenance access roads do not exist on channels, trails may have to merge onto sidewalks or on-street lanes. Successful engineered access (i.e., cantilevered paths over channels) may be possible in limited situations.

Table 2-8. Open Space and Trails: Opportunities and Constraints continued

Works Consulted

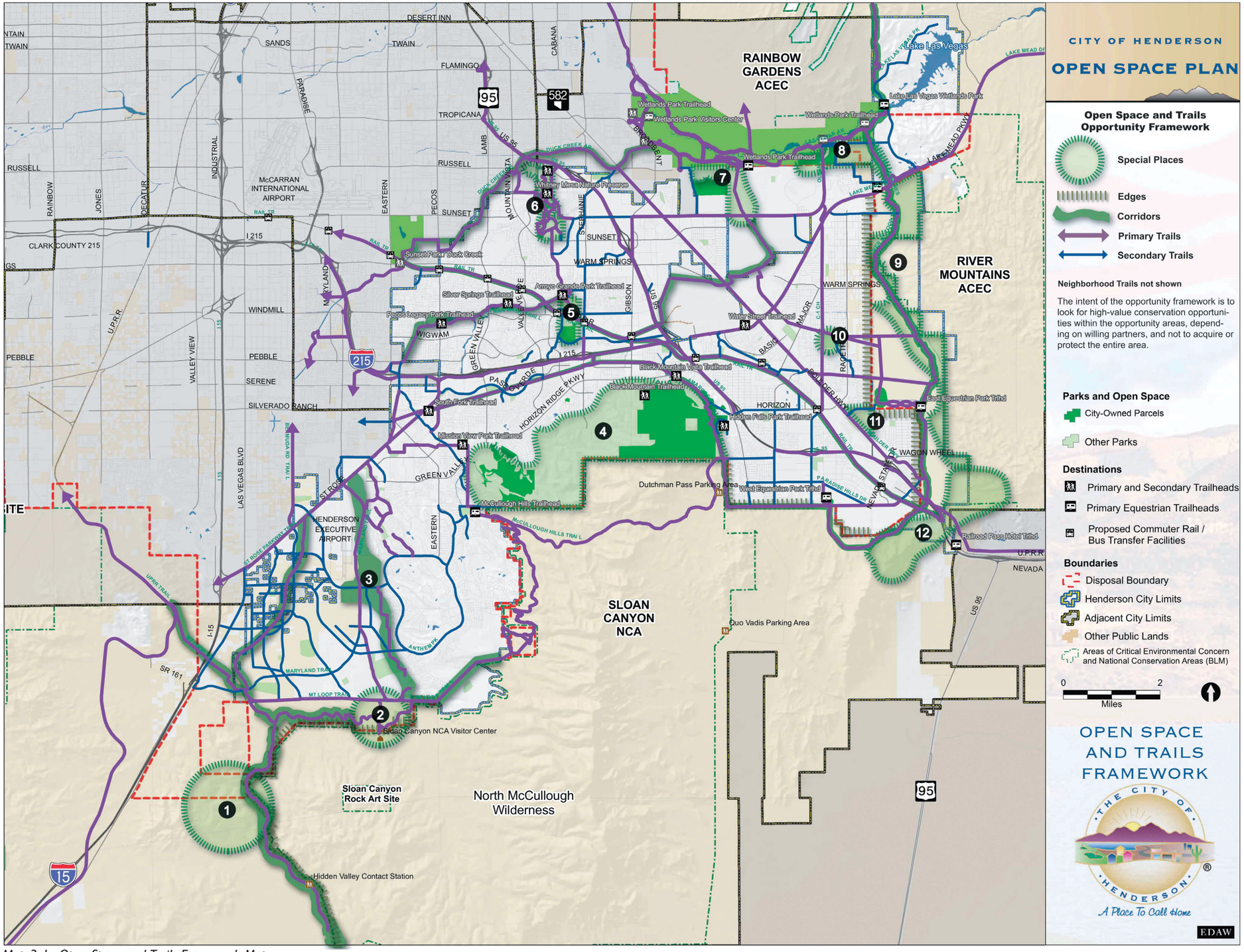
Acevedo, W., L. Gaydos, J. Tilley, C. Mladinich, J. Buchanan, S. Blauer, K. Kruger, and J. Schubert. "Urban Land Use Change in the Las Vegas Valley." U.S. Geological Survey. Available at http://geochange.er.usgs.gov/sw/changes/anthropogenic/population/las_vegas/. Accessed August 27, 2005.

Desert Conservation Program. *Desert Wash Newsletter.* Vol. 1, Issue 1 October 2004

CHAPTER 3:
TOMORROW

"Look forward a century, to the time when the city has a population of a million, and think what will be their wants. They will have wealth enough to purchase all that money can buy, but all their wealth cannot purchase a lost opportunity, *or restore natural features of grandeur and beauty, which would then possess priceless value, and which you can preserve for them if you will but say the word and save them from the destruction which certainly awaits them if you fail to utter it."*

Horace Cleveland
The 1882 Minneapolis Park System Plan



Map 3-1. Open Space and Trails Framework Map

Black Mountain in the Spring.

INTRODUCTION

Open space improves our quality of life, provides an escape from the urban setting, promotes awareness and respect for our desert environment, and defines a buffer for growth. As described in this Chapter, the City aims to respect and protect sensitive lands with distinguishing hillsides and ridgelines, natural drainages and wetlands, wildlife habitats and corridors, or historic and cultural features.

This chapter presents the framework, principles and policies for open space and off-street trails in the City of Henderson (the City). This Open Space and Trails Framework and supporting projects are based on the inventory of existing resources, threats, and the needs and priorities identified by City Council, Planning Commission, Parks and Recreation Board, a citizen's advisory committee, and the public (see Chapter 1). Implementation actions and other recommendations such as conservation tools and trail design standards are discussed in greater detail in Chapter 5.

This chapter is organized into three sections.

I. **Open Space and Trails Framework**: The Framework includes an open space and trails vision, followed by a map of conceptual open space and trail opportunities, and a discussion of different trail types and functions.

II. **Principles and Policies**: The purpose of the vision, principles and policies is to capture, at the most general level, the community's values, intentions, and aspirations for the physical growth and development of the City. They form the building blocks for the implementation recommendations and standards found in Chapter 5. Many of the principles and policies were developed in tandem with the Draft 2005 Comprehensive Plan Update. They are not intended to be absolute requirements, but rather they state the optimal outcome if feasible and appropriate.

III. **Landmark Projects**: A list of potential open space and trail projects identifies several short-term opportunities to assist in achieving the vision.

I. OPEN SPACE AND TRAILS FRAMEWORK

City of Henderson
Open Space and Trails Vision

Our vision is to create an interconnected system of protected desert environments throughout the built environment with parks, off-street trails, and open spaces for recreation and education, and compatible cultural programs, to enhance our community's unique image and sense of place. Henderson will have one of the most connected, safe trail systems in the Las Vegas Valley for both recreation and alternative transportation.

The Framework Map (Map 3-1) identifies opportunity areas and potential projects based on community needs, and presents a system for classifying open spaces (Table 3-1) in order to define an appropriate planning, acquisition, and management strategy for various types of properties that the City acquires. As open space is part of a spectrum of parks and common areas, many natural and interpretive areas can be combined successfully with active parks.

Special Places, Edges, and Corridors

The City of Henderson is fortunate to have many high-value natural resource lands within and adjacent to its boundaries. These sensitive lands are both environmentally and culturally significant features. The Framework Map identifies many of these sensitive lands as Open Space Opportunity Areas, or significant special places, corridors, and desert edges where protection efforts can accomplish a number of benefits to the community – such as community separation, hillside preservation, conservation of wildlife habitats, education, and public recreation – at one location. These strategic areas are identified conceptually without identifying specific privately-owned

Special Places

Nature Preserves: Larger areas (100 acres or more) intended to protect natural values of community-wide significance while also providing opportunities for nature-oriented, outdoor activities.

Natural Areas: These are areas intended to protect natural values on parcels smaller than a park preserve while also providing opportunities for nature-oriented outdoor activities.

Special Resource Areas: These are areas with important natural, cultural and other community values. Given the resource protection emphasis in these areas, public access may not be provided or may be limited.

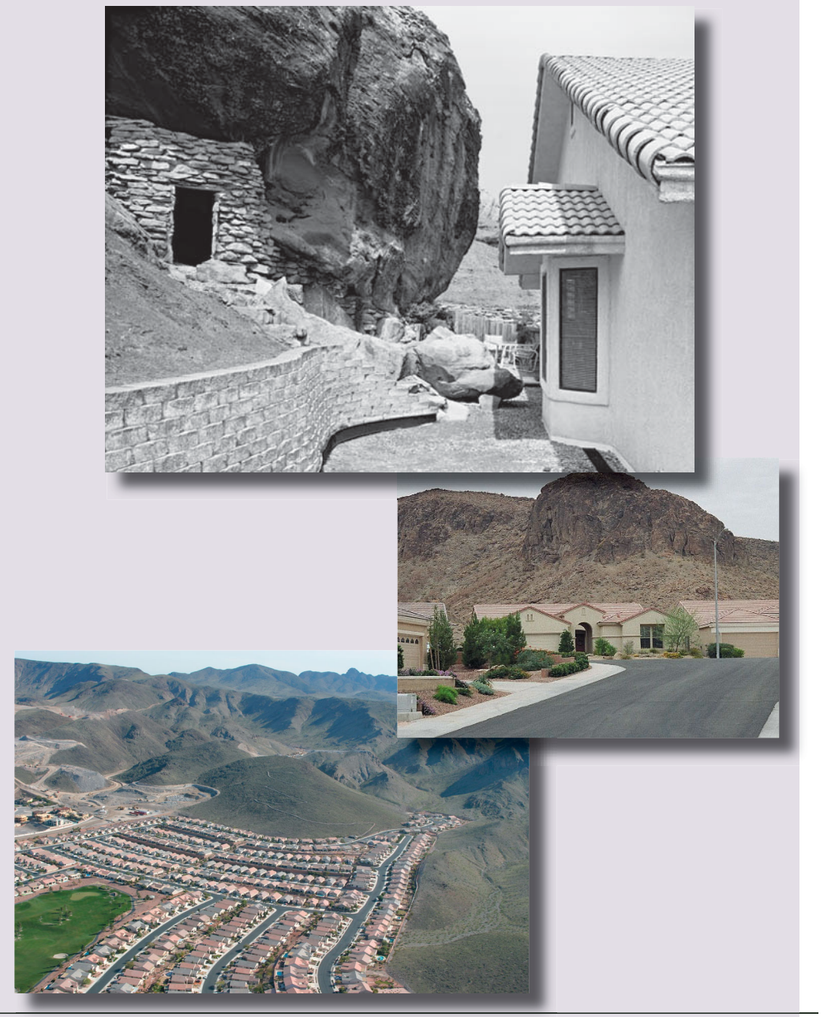
Table 3-1. Open Space Classification System

Corridors

Trails and open space corridors that serve recreational, wildlife, scenic, and other conservation purposes.

Edges

The "Edge" is the zone where existing or future urban development meets protected desert – whether it be federally managed land, like Sloan Canyon National Conservation Area, or land in the City's Open Space system, such as the Bird Viewing Preserve. These edges could accommodate urban requirements and provide appropriate public access while preserving scenic resources, and maintaining ecological functions.



parcels. The intent of the Framework Map is to look for high-value conservation opportunities within the opportunity areas, depending on willing partners, and not to acquire or protect the entire area.

Special Places

These Open Space Opportunity areas should be connected to one another by corridors that perform trail, drainage, or wildlife functions. In the face of continued habitat loss and cultural isolation from nature, the need for providing landscape connectivity is critical. Stream and wash systems are corridors of exceptional significance in a desert landscape. A few large patches of natural vegetation, and vegetated corridors along major washes are "indispensable," i.e., no known or feasible alternative exists for providing their many ecological and social benefits. Maintaining their ecological integrity in the face of intense human use is both a challenge and an opportunity.

Edges

Treatment of the Desert Edge, or the transition zone between urban development and open spaces, greatly impacts the recreational experience and protected resources. In particular, the recreational, wildlife, and aesthetic resources currently enjoyed by Henderson residents at Clark County Wetlands Park, the River Mountains Area of Critical Environmental Concern (ACEC), and Sloan Canyon National Conservation Area (NCA) could be compromised by nearby urban development. By creating appropriate transitions between urban and public land, the City can maximize the benefit of adjacent public lands to its citizens without incurring direct management responsibilities and costs.

Corridors

As stated in the Open Space and Trails Vision, Henderson aims to have one of the most extensive regional trail systems in the Las Vegas Valley; a system that would safely connect neighborhoods to community destinations, adjacent communities, and surrounding recreation and leisure opportunities. Trails provide critical connections between recreational, civic and neighborhood uses, while creating corridors that preserve wildlife habitat and other special places. Well connected trail systems have become an expectation of home buyers in many communities because they increase property values, provide easy recreation access and afford an option to travel on foot or bicycle rather than in an automobile. A successful trail system accommodates a wide variety of users, allows access without getting into a vehicle, and provides connections to key community destinations such as Sloan Canyon NCA, the River Mountains ACEC, Black Mountain and Lake Mead National Recreation Area (NRA).

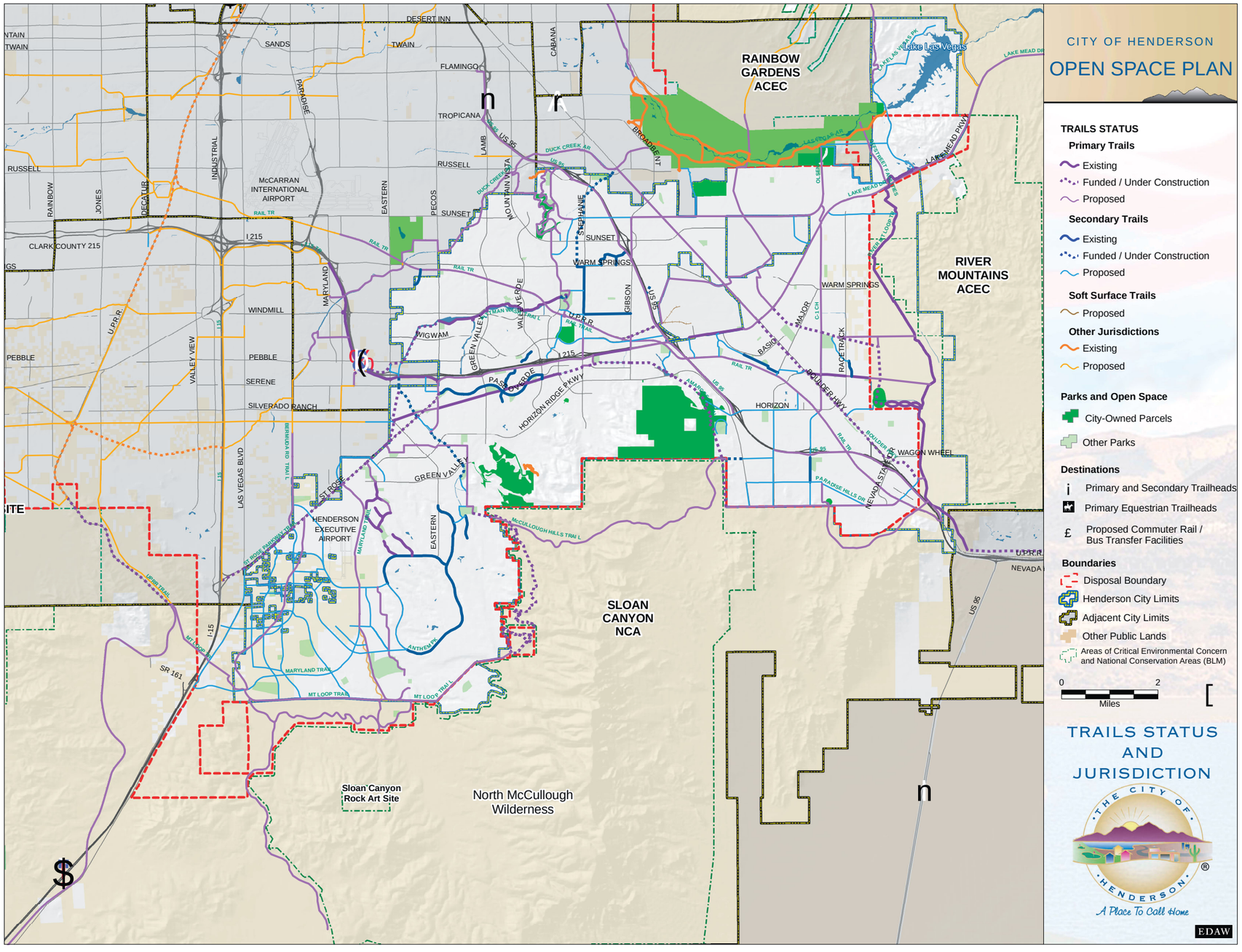
Landmark Corridors (Greenways)
Primary Trails
Secondary Trails
Neighborhood Trails / Paths
Equestrian Trails
Soft-surface Trails

The purpose of this section is to provide a City-wide off-street trail classification system that guides the City's decision process in creating a functional, interconnected trail system as development and infrastructure improvements occur. Trails – by their very nature – optimally occur in non-vehicular corridors with appropriate pedestrian amenities, aesthetic enhancements and connections. As noted in Chapter 1, this plan addresses trails that are primarily recreational in nature, although trails also support alternative transportation goals. Bicycle, pedestrian, and other on-street facilities are addressed in the City's Master Bicycle Plan Map, Master Streets and Highways Plan, and Regional Transportation Commission's Non-motorized Alternative Transportation Mode Conceptual Master Plan documents. In combination with a full suite of bicycle and pedestrian facilities (bike lanes, parking areas, sidewalks, end-of-trip facilities, etc.), residents will be able to easily access the off-street trails system from within their own neighborhoods without driving to a trailhead. Special use paths such as raised boardwalks should be designed to meet site-specific conditions and, as such, are not included in the following classification system.

The Open Space and Trails Framework Map identifies trail corridor locations based on existing and future community needs, and connections to open space

Pittman Wash Landmark Corridor performs recreational, ecological, and storm drainage functions. It is the focus of Project GREEN (Green Valley Ecology, Environment, and Nature), a 2.5 mile community restoration project directed by a citizen's steering committee assisted by City staff and a technical advisory committee.

The existing Pittman Wash Trail, approximately four miles in length, is located along the Pittman Wash drainage channel, connecting the Arroyo Grande Sports Complex, Silver Springs Recreation Center and Park, Pecos Legacy Park, Cactus Wren Park, and Amargosa Trail. Grants received from SNPLMA and the Nevada State Division of National Parks Service Recreational Trails (RecTrail) program have allowed the City to complete three undercrossings.



Map 3-2. Primary and Secondary Trails Status

opportunities. The intent of the map is to show conceptual alignments and identify critical linkages. Map 3-2 shows existing trails with a solid line, while conceptual alignments for future trails are shown with a dashed line. Conceptual alignments require detailed analysis and design prior to construction, especially in cases where trails are proposed in developed areas in order to determine exact locations and designs for all trails, underpasses and crossings.

Conceptual alignments are found in one of two conditions: 1) trails that need to be constructed within existing developed areas (i.e., retrofitted), and 2) trails in future growth areas that will be constructed in tandem with new development. For future growth areas, it is critical that the connections be made to the general areas shown. Primary trails in these developments should be located in open trail corridors and not along streets. It is critical that designs in areas requiring underpasses and trails along flood control channels be coordinated in advance with the appropriate governing agency to ensure that the trail connectivity goals are met.

Trails Classifications

The trails classification system shown on the Framework Map is described in Table 3-2 on page 11. Design criteria for each classification is determined by its primary users, volume of use, location and desired trail experience. These criteria are intended to apply to developing areas only. *Criteria for trails in existing developed areas may not be met in some instances due to existing constraints* such as narrow corridor widths, flood control channel configurations or narrow right-of-ways. Although not preferred, some primary trails are shown on the Trails Framework Map within roadway corridors as they allow the only means for making some primary connections.

Current AASHTO, MUTCD, ADA and other local guidelines and codes for trail designs should be incorporated into final trail designs. These may include horizontal and vertical curve allowances, frequency, size and placement of signage, underpass clearances, safety criteria and design speeds.

Landmark Corridors

A Landmark Corridor for trail users is equivalent to a scenic byway for motorists. Primary trails located in Landmark Corridors have regional significance, and will attract users from all communities in the Las Vegas Valley. They are recreational destinations in and of themselves, or lead to destinations such as Wetlands Park, Lake Mead, or Sloan Canyon NCA. Landmark Corridors do not suggest specific design criteria, but rather a unique user experience.

In order to provide this unique experience, Landmark Corridors must be carefully planned and designed. In Landmark Corridors, greater emphasis is given to interpretation, vehicular separation (underpasses and bridges) and larger corridor width. In Landmark Corridors, users will be encouraged to learn about, appreciate and experience the natural environment of the desert. Trail corridor width greatly influences the user experience, especially when enclosed on both sides by development. Ideally, Landmark Corridors should be located in non-motorized corridors with a minimum width of 75 feet, although this may not be feasible in many areas.

Key Landmark Corridors with recreational trails, as identified on the Framework Map, include:

- Mountain Loop Trail
- River Mountains Loop Trail
- Duck Creek Trail
- Pittman Wash Trail
- McCullough Hills Trail
- Amargosa Trail
- Wetlands Park Trail (Clark County)

Additional Landmark Corridors should be planned for and designed as the City grows.

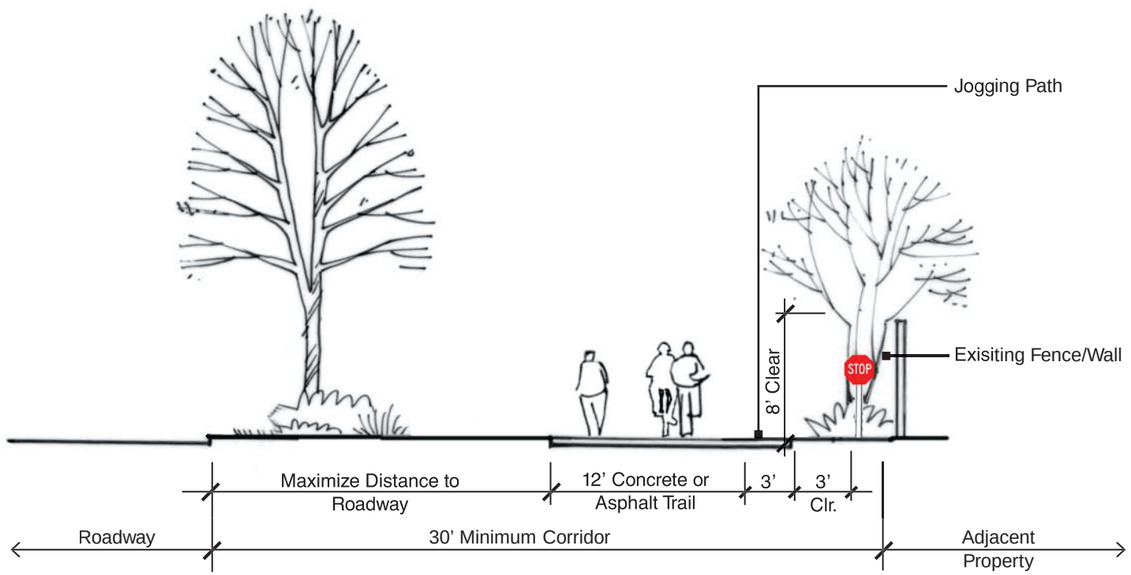


Figure 1 Primary Trail Adjacent to Roadway.

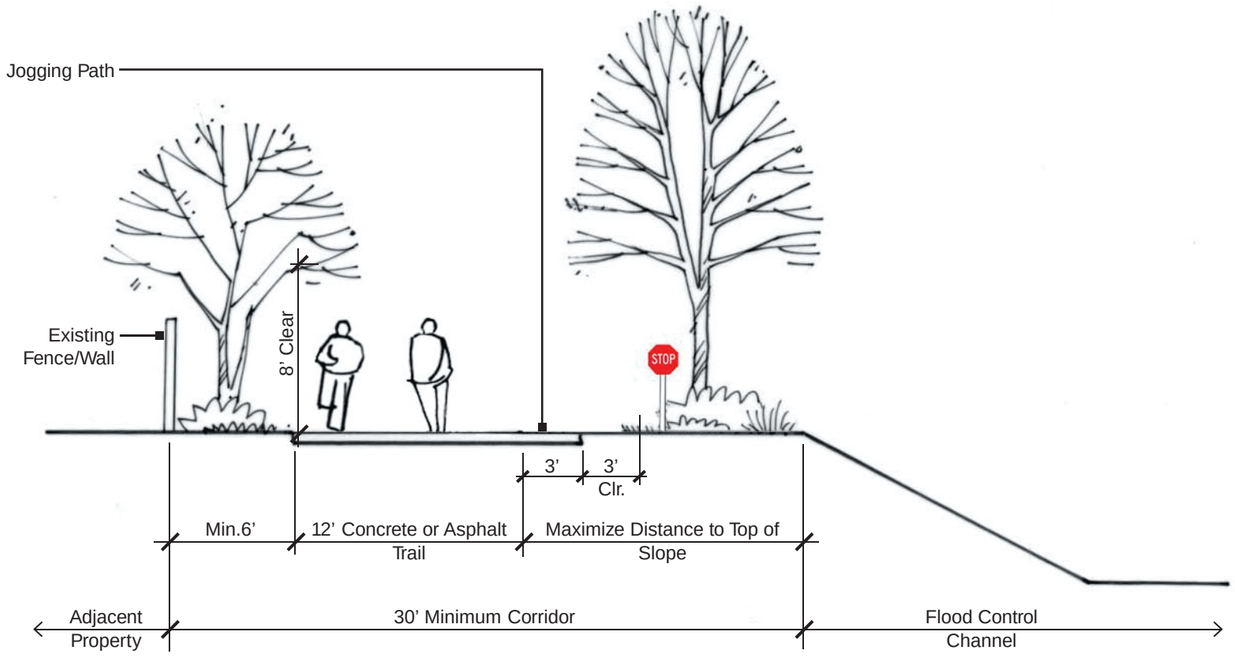


Figure 2 Primary Trail Adjacent to Flood Control Channel.

Primary Trails

Purpose – Primary trails are recreational destinations where users can spend a day or several hours exploring the trail. They accommodate a large number of daily users and generally are designed for higher speed use than secondary trails. This intense use requires an appropriate sign system and that other design criteria be met, in order to make the trail a fun and safe experience for all types of users.

Primary Trails provide access to key community destinations and connect the City of Henderson to surrounding communities in the Las Vegas Valley. They accommodate trail users, including walkers, joggers, in-line skaters, and recreational and commuter cyclists. Where appropriate, equestrian users may also be accommodated within the same trail corridor. Some examples of existing Primary Trails include the Amargosa Trail, St. Rose Parkway Trail, and Lake Mead Trail.

Design Standards – Trail corridor width greatly influences the user experience, especially when the trail is enclosed on both sides by development. Ideally, Primary Trail corridors should be located along drainageways, utility easements, or other linear features where maximum corridor and separation from roadways can be achieved. Parallel equestrian trails or soft surface jogging shoulders may be provided, where appropriate. Intersections and other areas where users must stop or dismount should be minimized. Below grade crossings should be used as much as possible, especially at arterial streets, in order to minimize pedestrian-vehicle conflicts. Trailheads, trail waysides and interpretive signs should be provided at strategic locations throughout the corridor. Preferred design standards are shown in Figures 1 and 2.

Secondary Trails

Purpose – Secondary Trails support the Primary Trail system by providing connections to neighborhoods, parks, open spaces, and activity centers that are not on the primary system. Like Primary Trails, these trails are designed to accommodate all trail users including walkers, joggers, and recreational and commuter cyclists on the same trail. Secondary trails are generally not destination trails, have lower travel speeds and require slightly more narrow corridors than Primary Trails. Secondary Trails will most often occur within roadway corridors and may have more at-grade vehicular crossings.

Design Standards – Trail corridors should maximize separation from vehicular travel lanes. Landscape buffers become more essential to enhancing the user experience in the more narrow corridor width and provide critical separation from adjacent uses. Preferred design standards are shown in Figures 3 and 4.

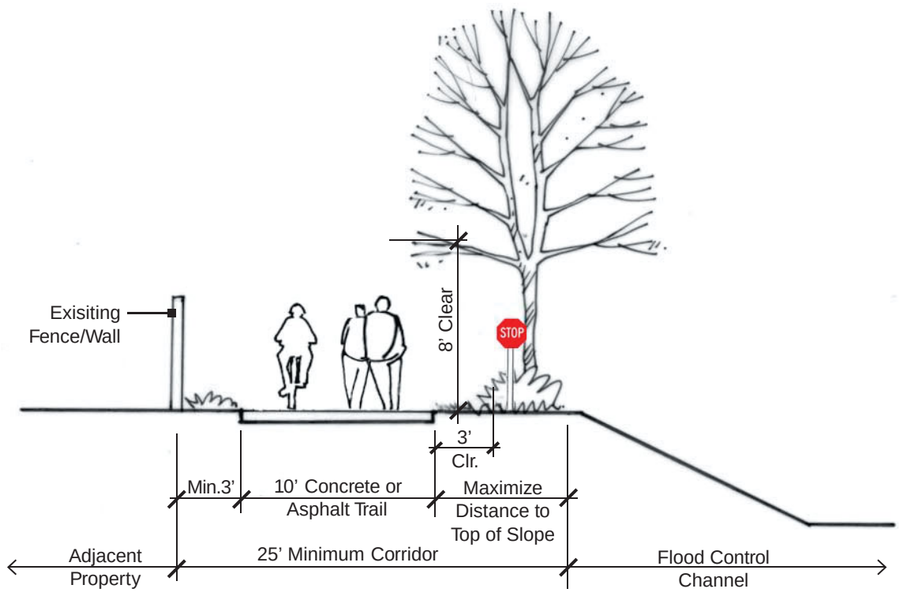


Figure 3 Secondary Trail Adjacent to Flood Control Channel.

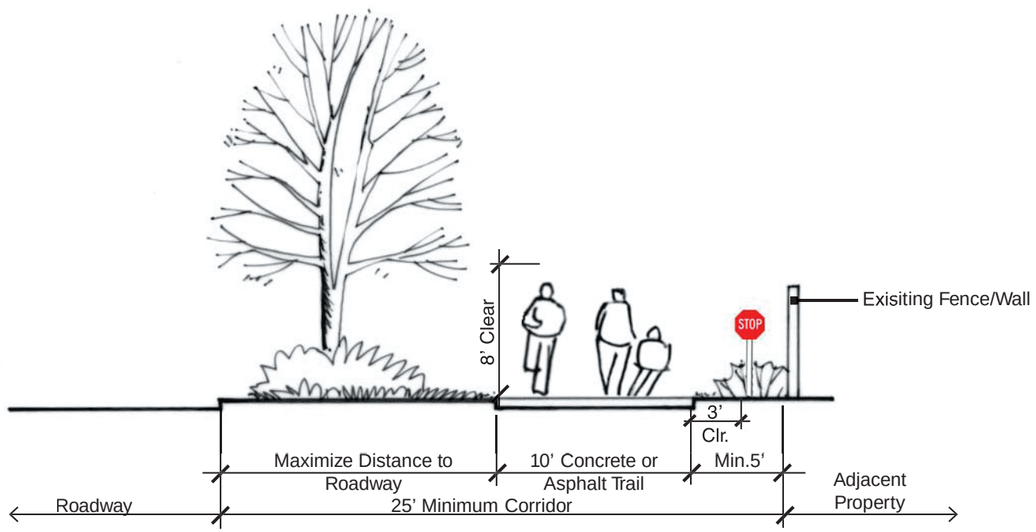


Figure 4 Secondary Trail Adjacent to Roadway.

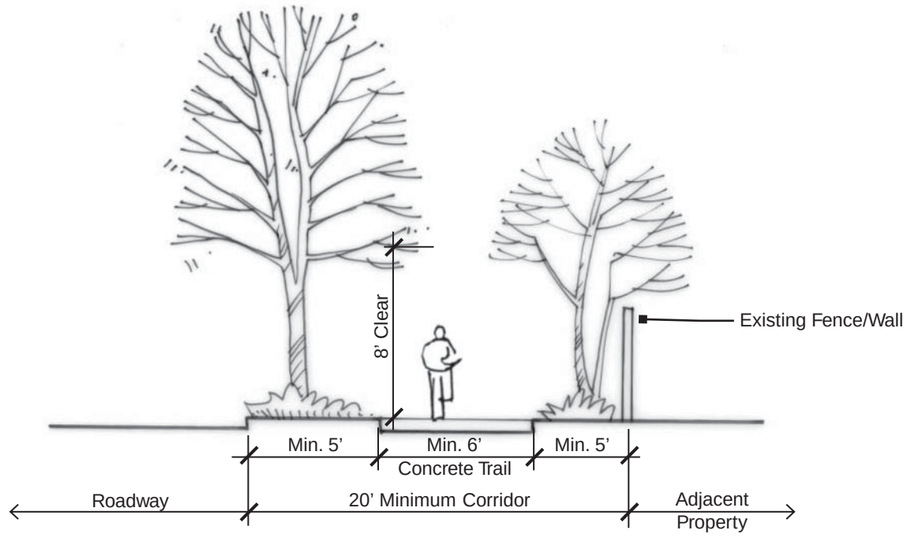


Figure 5 Neighborhood Trail.

Neighborhood Trails / Paths

Purpose – Neighborhood trails are not shown on the Framework Map as they do not provide city-wide connectivity. These "trails" are wide sidewalks within residential or commercial developments, and provide connections to Secondary and Primary Trails while also providing some level of recreational opportunities within the neighborhood itself. In most cases, Neighborhood Trails are to be provided by the project developer and should connect users to neighborhood parks, schools, libraries and shopping centers, as well as provide internal circulation within the development These types of trails are encouraged in the City of Henderson Municipal Code: "To the maximum practical extent, subdivisions shall be laid out and designed to provide walkways and paths that connect with destinations such as parks, schools and shopping areas," (19.10.9).

Design Standards – Where possible, sidewalks should be detached from roadways. Sidewalks should be designed per appropriate street standards. Preferred design standards are shown in Figure 5.

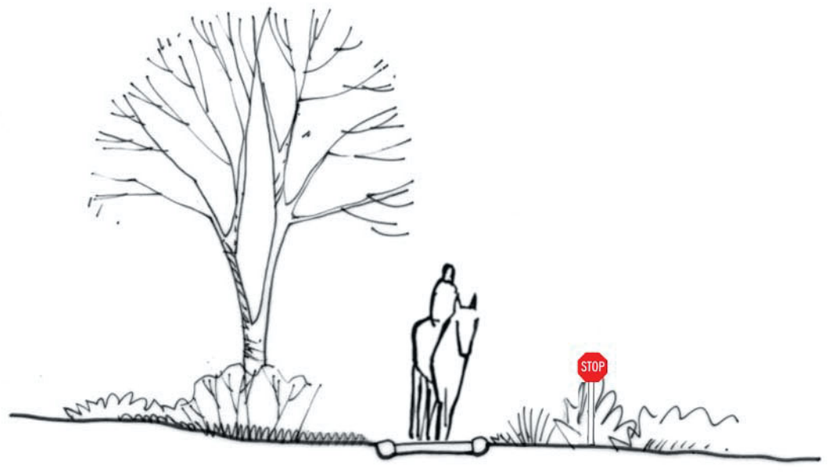


Figure 6 Equestrian Trail.

Equestrian Trail

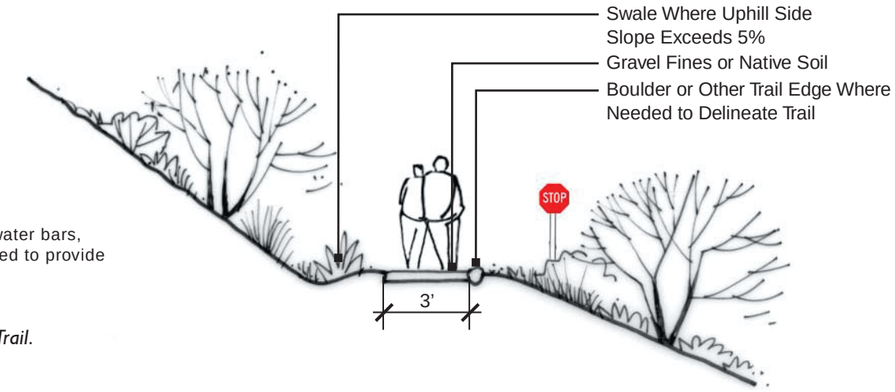
Purpose – Soft-surfaced, parallel trails allow equestrians to share the same user experience as pedestrians on Primary or Secondary Trails. As many rural areas become urbanized, trails used by equestrians in the past are becoming unsafe for equestrian use. Adding parallel trails in these areas will allow equestrian use to continue. Specific locations of equestrian trails are not identified on the Framework Map. Exact locations for equestrian trails need to be evaluated based on proximity to other equestrian facilities and user demand.

Design Standards – Where equestrian use is desired in the same corridor as a soft surface pedestrian trail, both uses should share the same surface and the equestrian design criteria will take precedence. If an equestrian trail runs parallel to a paved Primary or Secondary Trail, the equestrian trail should be separated by a landscaped clear zone of 5 feet minimum to avoid conflicts with cyclists and other users. Preferred design standards are shown in Figure 6.

Soft Surface Trails

Purpose – Soft Surface trails are gravel, fines or natural surface trails within mountain or foothill open spaces. They are designed for slower speeds and lower volumes of use. Targeted users include hikers and mountain bikers. Soft surface trails are destination trails which provide an alternative experience to the urban and suburban trails of Primary and Secondary Trails.

Design Standards – Surfacing may include crushed granite, gravel, fines, or native material. Soil hardener may be required in some areas to help prevent erosion and mitigate dust. Although minimum width is required, additional width (10') may be necessary for vehicular access depending on how maintenance will be completed. Water bars, rolling dips and drainage culverts will be required to maintain proper trail drainage. Preferred design standards are shown in Figure 7.

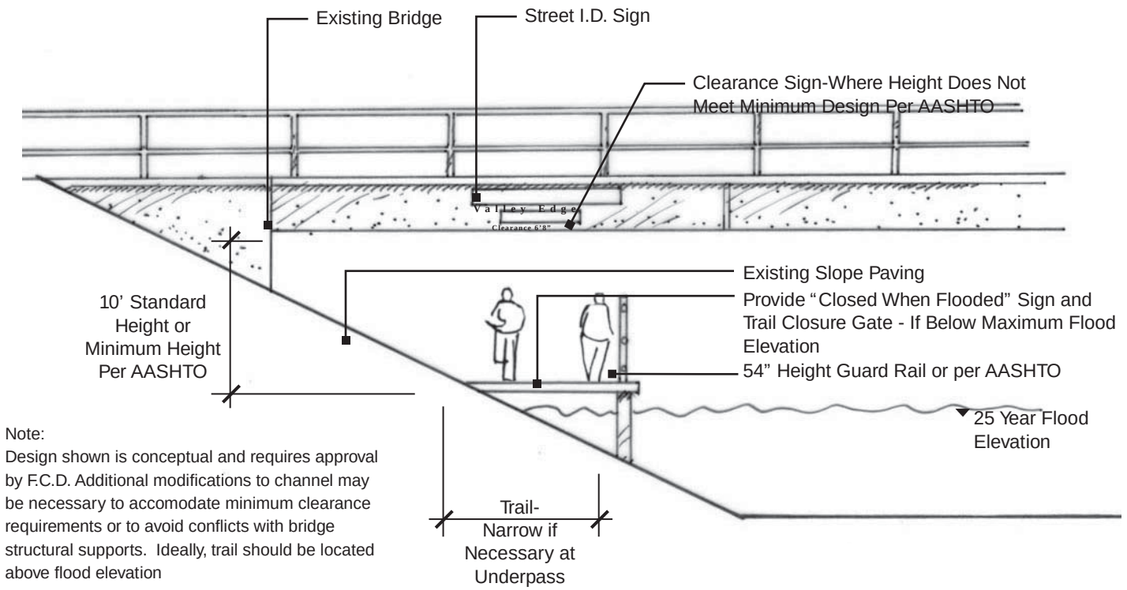

Swale Where Uphill Side Slope Exceeds 5%
Gravel Fines or Native Soil
Boulder or Other Trail Edge Where Needed to Delineate Trail
STOP
3'

Note:
Provide rolling dips, water bars, culverts, etc. as needed to provide drainage across trail.

Figure 7 Soft Surface Trail.

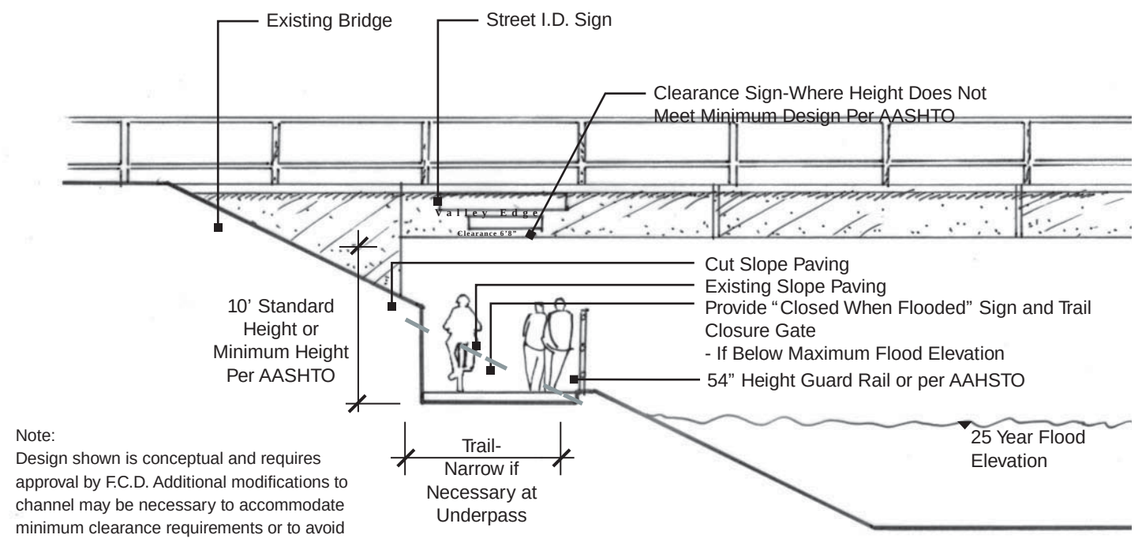
	Primary Trails	Secondary Trails	Neighborhood Trails	Equestrian Trails	Soft Surface Trails
Uses	▪ Connect community destinations, parks and open space ▪ Recreation destination for pedestrians, bicyclists and other non-motorized users ▪ Commuting	▪ Connect community destinations, neighborhoods, parks and open space ▪ Recreation ▪ Commuting	▪ Internal connection within neighborhoods ▪ Connects neighborhoods to Primary and Secondary Trails	▪ Trail specifically designed for recreational equestrian use ▪ Parallels other trail classifications	▪ Recreation destination for pedestrians, bicyclists and other non-motorized users
Preferred Location	▪ Transit, open space, greenway or drainage corridors	▪ Roadway corridors ▪ Detached sidewalks	▪ Roadway corridors ▪ Detached or attached sidewalks	▪ Open space, greenway or drainage corridors ▪ Undeveloped backcountry, open space or rural areas	▪ Undeveloped backcountry, open space or rural areas ▪ Natural setting
Preferred Corridor Width	▪ 75 feet optimal width, 30 feet minimum	▪ 25 feet width minimum	▪ Per development code	▪ Per parallel trail	▪ NA
Trail Width	▪ 12 feet ▪ Parallel 3 foot jogging path	▪ 10 feet	▪ 6 feet minimum	▪ 3 feet	▪ 3 feet ▪ 10 feet where maintenance vehicle access required
Trail Surface	▪ Asphalt (preferred) or concrete ▪ Crushed gravel jogging path	▪ Concrete	▪ Concrete	▪ Crushed gravel or native soil with dust inhibitors and soil hardener	▪ Crushed gravel or native soil with dust inhibitors and soil hardener
Vertical Clearance	▪ 8 feet	▪ 8 feet	▪ NA	▪ 12 feet	▪ NA
Horizontal Clearance	▪ Min. bridge width 10 feet ▪ Min. 3 feet both sides	▪ Min. bridge width 8 feet ▪ Min. 3 feet both sides	▪ NA	▪ Min. 5 feet both sides	▪ Min. 3 feet both sides
Landscape	▪ Per development code	▪ Per development code	▪ Per development code	▪ Per development code	▪ Per development code
Guardrails and Handrails	▪ Per AASHTO	▪ Per AASHTO	▪ Per AASHTO	▪ Per AASHTO	▪ Per AASHTO
Lighting	▪ At trailheads and access points ▪ At underpasses ▪ At crosswalks and intersections	▪ At trailheads and access points ▪ At underpasses ▪ At crosswalks and intersections ▪ Utilize adjacent roadway lighting where appropriate	▪ Utilize adjacent roadway lighting	▪ Per parallel trail	▪ At trailheads and access points
Trail Waysides	▪ Major waysides one per mile or as utilities are available ▪ Minor waysides every ½ mile ▪ Combine with trailheads where possible	▪ Minor waysides every ½ mile ▪ Combine with trailheads where possible	▪ NA	▪ Per parallel trail	▪ Minor waysides at areas of visual or interpretive interest, no utilities
Grade	▪ 5% max.	▪ 5% max. or per adjacent roadway	▪ 5% max. or per adjacent roadway	▪ Per parallel trail	▪ 5% max. for trails designated as universally accessible ▪ Steps may be required on slopes exceeding 10%
Signs	▪ Per MUTCD ▪ Trail distance markers every 0.10 mile	▪ Per MUTCD	▪ Per MUTCD	▪ Per MUTCD	▪ Per MUTCD
Markings	▪ 4 inch center stripe per AASHTO	▪ None	▪ None	▪ None	▪ None
Trailheads	▪ At major access points ▪ Use parks and open space parking areas and facilities where possible ▪ Restroom, shaded seating and picnic areas ▪ Regulatory, informational and entry signs	▪ At major access points ▪ Use parks and open space parking areas and facilities where possible ▪ Shaded seating and picnic areas ▪ Regulatory, informational and entry signs	▪ NA	▪ Per parallel trail	▪ At trail access points ▪ Use parks and open space parking areas and facilities where possible ▪ Restroom, shaded seating and picnic areas ▪ Regulatory, informational and entry signs

Table 3-2. Trail Classifications


Existing Bridge
Street I.D. Sign
Clearance Sign-Where Height Does Not Meet Minimum Design Per AASHTO
Valley Edge
Clearance 6'8"
Existing Slope Paving
Provide "Closed When Flooded" Sign and Trail Closure Gate - If Below Maximum Flood Elevation
54" Height Guard Rail or per AASHTO
10' Standard Height or Minimum Height Per AASHTO
25 Year Flood Elevation
Trail-Narrow if Necessary at Underpass

Note:
Design shown is conceptual and requires approval by F.C.D. Additional modifications to channel may be necessary to accomodate minimum clearance requirements or to avoid conflicts with bridge structural supports. Ideally, trail should be located above flood elevation

Figure 9 Trail Underpass - Option A (preferred)


Existing Bridge
Street I.D. Sign
Clearance Sign-Where Height Does Not Meet Minimum Design Per AASHTO
Valley Edge
Clearance 6'8"
Cut Slope Paving
Existing Slope Paving
Provide "Closed When Flooded" Sign and Trail Closure Gate
- If Below Maximum Flood Elevation
54" Height Guard Rail or per AAHSTO
10' Standard Height or Minimum Height Per AASHTO
25 Year Flood Elevation
Trail-Narrow if Necessary at Underpass

Note:
Design shown is conceptual and requires approval by F.C.D. Additional modifications to channel may be necessary to accommodate minimum clearance requirements or to avoid conflicts with bridge structural supports. Ideally, trail should be located above flood elevation

Figure 10 Trail Underpass - Option B

Trails In Existing Developed Areas

Discussion

The classifications in Table 3-2 outline preferred locations and design criteria for new trails. However, throughout Henderson, there are many trails which must be fitted into existing environments with conditions which prevent the trail from being built to preferred standards.

Recommendations

Trails in these locations will need to be evaluated on a site specific case-by-case basis. As-built conditions, available corridor widths and other constraints must be examined and a course of action decided that best implements the goals of the overall trail system. Figures 8 through 19 show existing constraints and provide examples of how some problem areas may be addressed. Some improvements may entail significant costs that would not have been necessary if the trail corridor had been considered during the original design process. Many proposed modifications will require approval, cooperation and coordination with other City departments or government agencies, such as the Federal Highway Administration, Nevada Department of Transportation, and Clark County Flood Control District.

Figure 8 Duck Creek Underpass - Existing Conditions

Figure 11 Rail Corridor - Existing Conditions

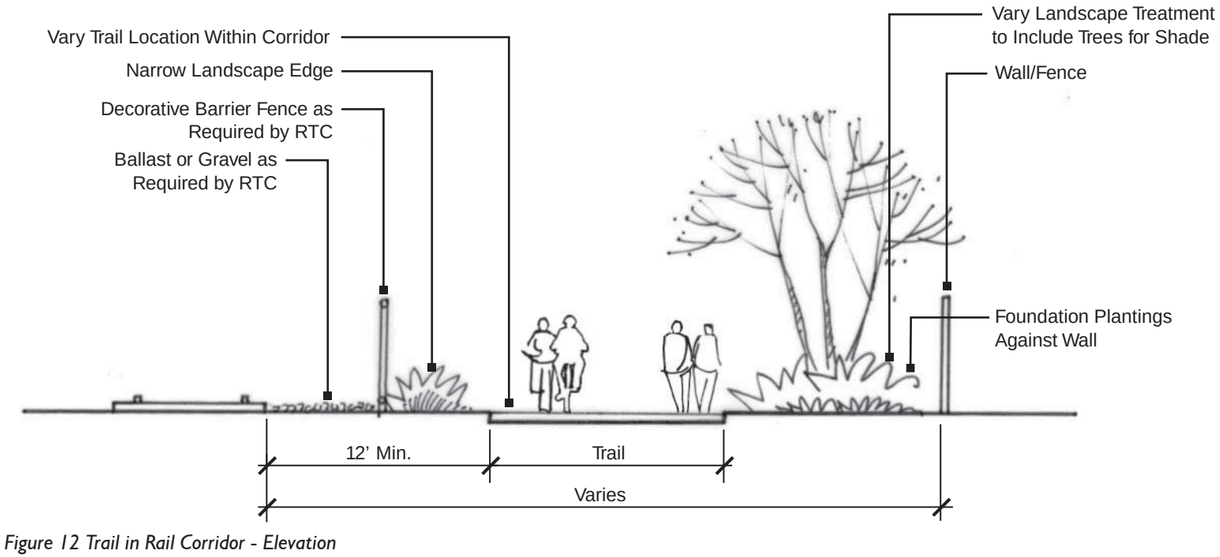


Figure 12 Trail in Rail Corridor - Elevation

DESIGNING AND PLANNING A SUCCESSFUL TRAIL SYSTEM

Several specific components that will contribute to the success of Henderson's trail system include:

1. Intersections and other areas where users must stop or dismount should be minimized. Primary trails should take precedence as a main transportation feature just like any road system, and pedestrian underpasses should be incorporated into any planned roadway or bridge improvements. Separated grade crossings should be used as much as possible, especially at arterial streets, in order to minimize pedestrian-vehicle and bicycle-vehicle conflicts. Minimize or eliminate mid-block crossings at non-controlled intersections to increase user safety and reduce conflicts.

2. The trail experience should take advantage of landscapes and environments unique to the area, providing opportunities to interpret and experience different desert environments.

3. The distance of the trail from edges of drainages and other features should vary throughout the length of the trail, creating a meandering, interesting alignment rather than a straight parallel alignment.

4. Slopes and directional changes make for a more interesting trail experience.

5. Connections to community destination points encourage non-vehicular travel to civic events.

6. Take advantage of historical features along the trail corridor.

7. Provide for proper drainage under trails to minimize flooding.

8. Trail corridors should be considerate of wildlife habitat and other sensitive areas. Keeping the trail adjacent to, but outside of the habitat area often creates a better user experience and encourages more abundant wildlife.

9. Utilize existing flood control, powerline and other easements to create trail corridors rather than paralleling roadways.

10. Strategically locate trailheads at activity centers.

11. Provide benches, overlooks and interpretive areas at activity centers and other strategic locations throughout the corridor.

12. Communicate early in the design process with affected property owners if trails will be retrofitted into existing areas.

13. Trails should not be located in vehicular corridors, except as a last resort.

Figure 13 Pittman Wash Near Broadbent

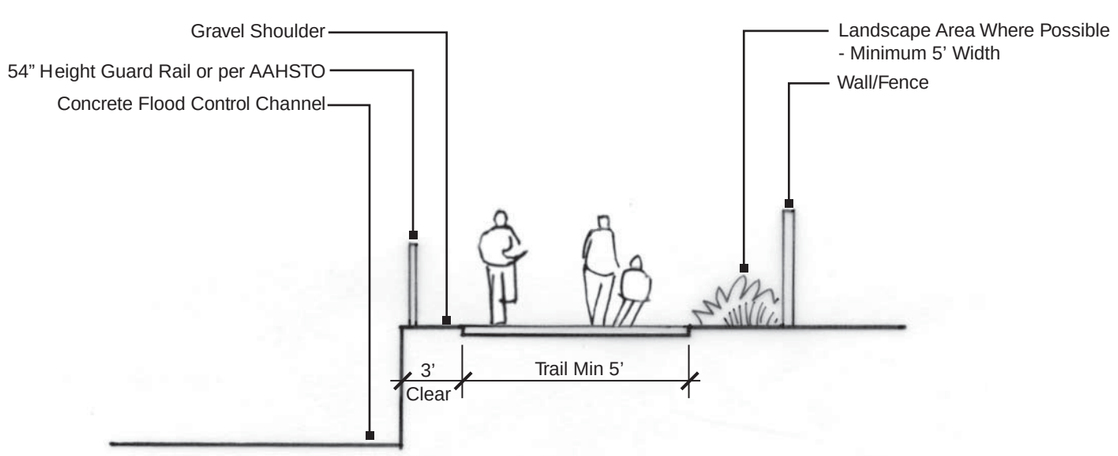


Figure 14 Trail at Broadbent.

Existing condition and materials were not designed to invite trail users.
Generous bench allows space for trail and landscape edge.

Figure 15 Existing Conditions

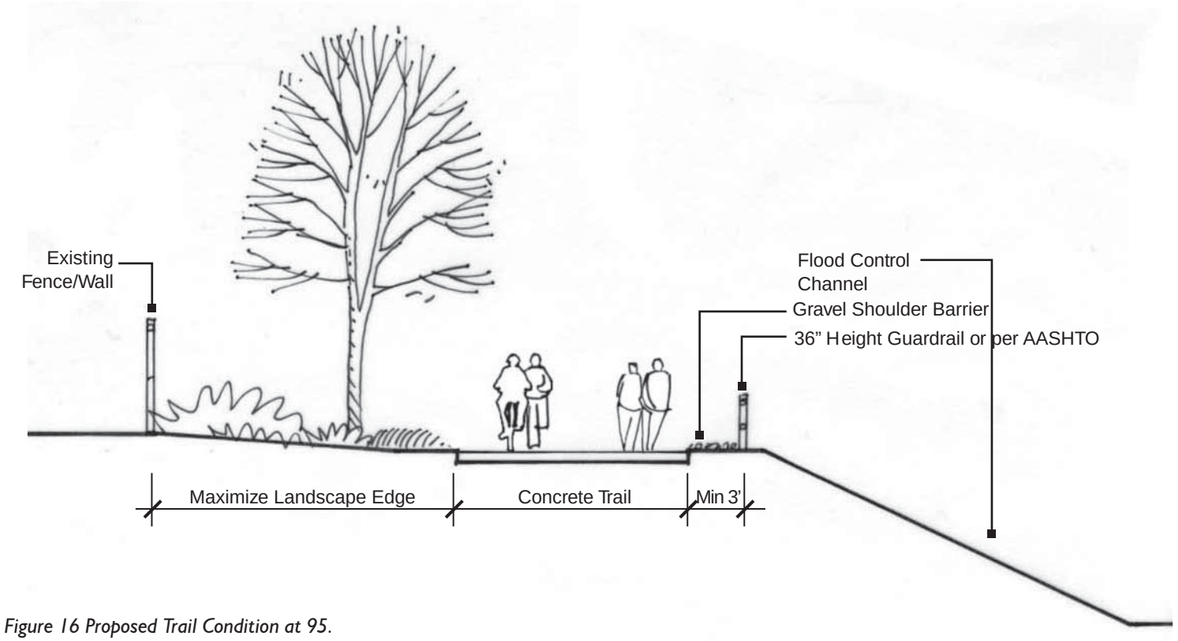


Figure 16 Proposed Trail Condition at 95.

Figure 17 Existing Conditions

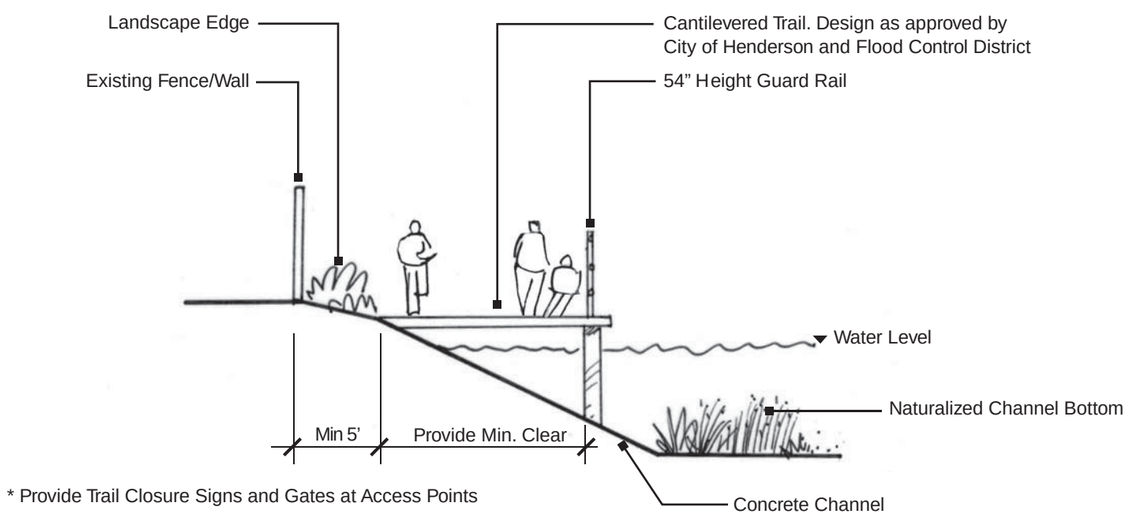

Landscape Edge
Existing Fence/Wall
Cantilevered Trail. Design as approved by City of Henderson and Flood Control District
54" Height Guard Rail
Water Level
Naturalized Channel Bottom
Min 5'
Provide Min. Clear
Concrete Channel
* Provide Trail Closure Signs and Gates at Access Points

Figure 18 Constrained Flood Channel Condition.

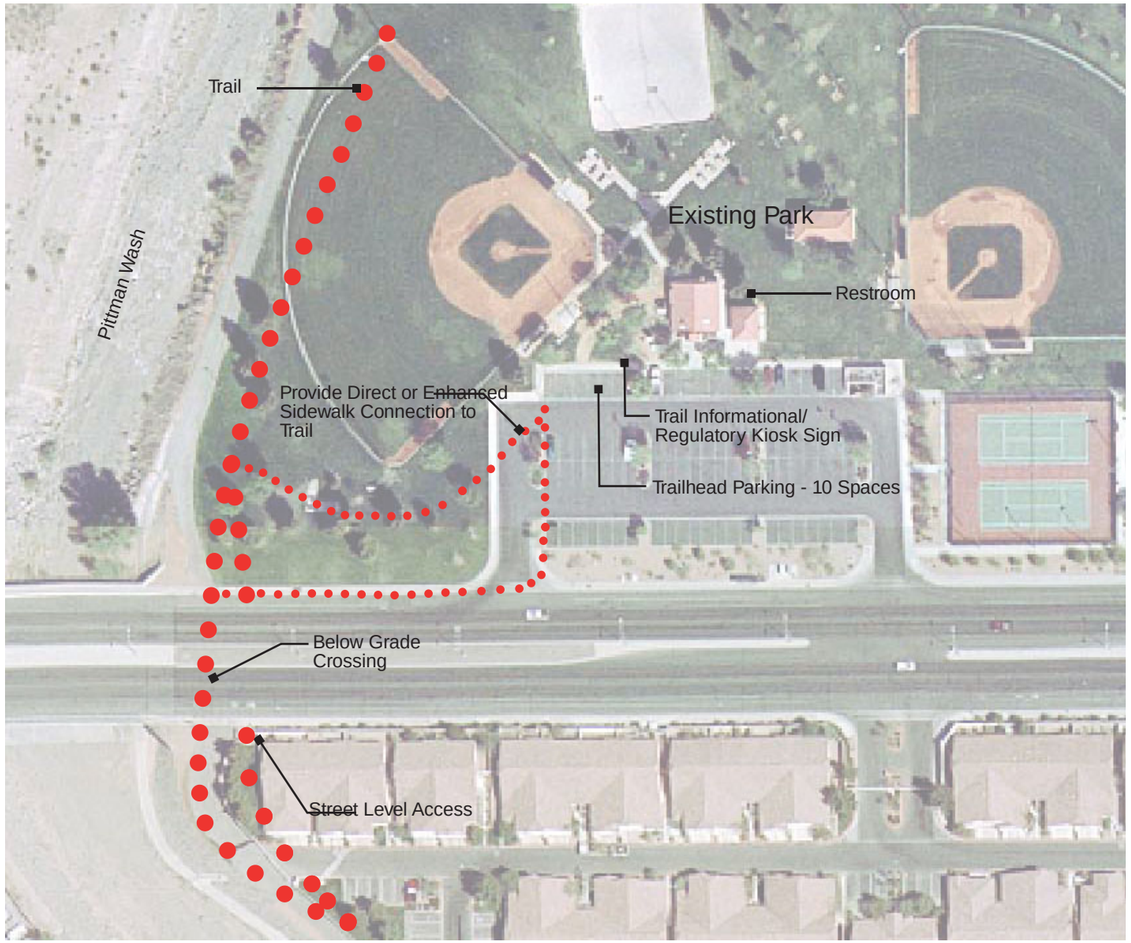


Figure 19 Trailhead at Existing Park

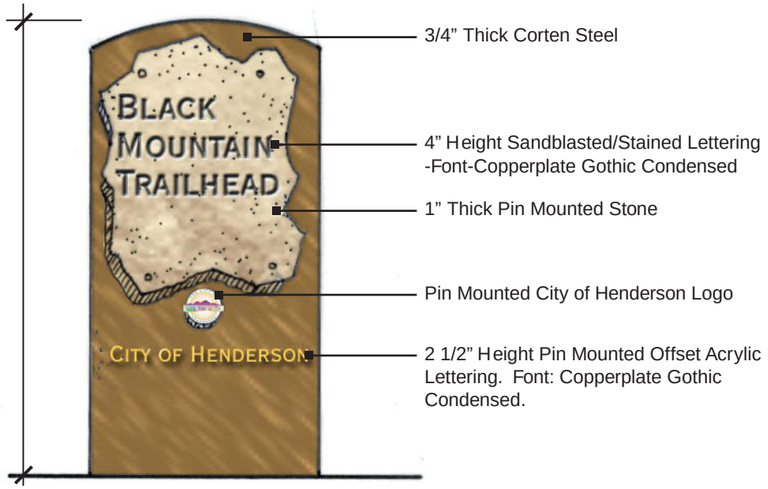

BLACK MOUNTAIN TRAILHEAD
CITY OF HENDERSON
3/4" Thick Corten Steel
4" Height Sandblasted/Stained Lettering -Font-Copperplate Gothic Condensed
1" Thick Pin Mounted Stone
Pin Mounted City of Henderson Logo
2 1/2" Height Pin Mounted Offset Acrylic Lettering. Font: Copperplate Gothic Condensed.

Figure 20 Entry Sign

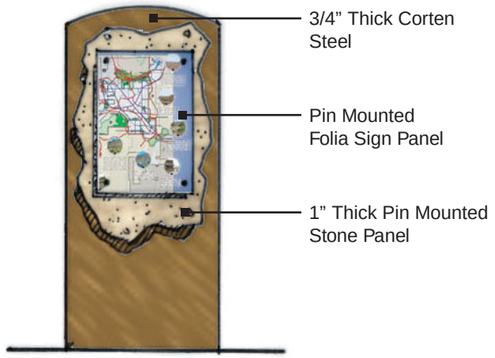


Figure 21 Kiosk/Regulatory Sign

Figure 22 Distance Marker

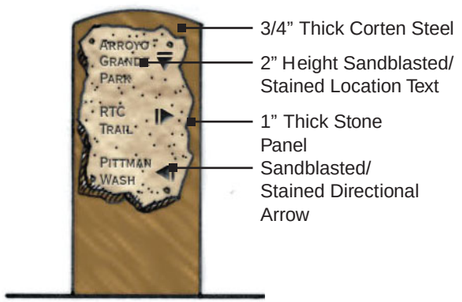


Figure 23 Wayfinding Sign

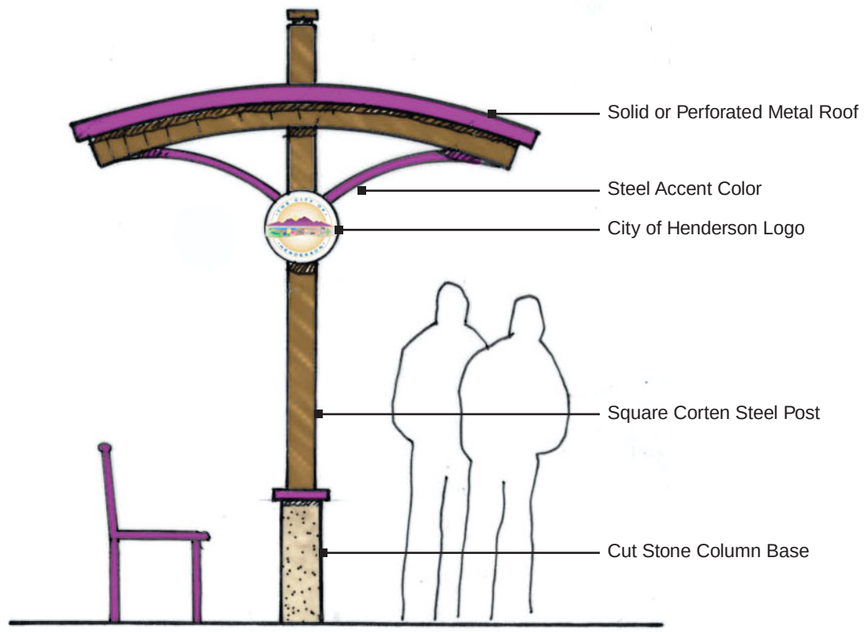

Solid or Perforated Metal Roof
Steel Accent Color
City of Henderson Logo
Square Corten Steel Post
Cut Stone Column Base

Figure 24 Shade Structure

Trail System Amenities - Design Recommendations

Site Furnishings

In addition to functional uses, site furnishings reinforce the overall theme of the trail system, using colors, materials and forms. Site furnishings should be simple, durable and low maintenance. If custom furnishings are used they should be readily available for new projects and replacements. It is most cost effective to maintain the same site furnishings throughout the entire trail system. Additional custom identifiers can be added for Landmark Corridors.

Signs

A standardized trail sign system is key to the success of the trail system. Signs can carry one theme throughout the entire trail system while still allowing for unique identities for specific trail segments. Legacy trails should have a distinct identifier demonstrating the unique characteristics of the trail. A complete identification system includes entry signs for use at trail access points, shade structures for use at trail waysides, informational and regulatory signs for display at trailheads, trail wayfinding signs and trail distance markers. Use of low maintenance and native materials is recommended. Figures 20 through 24 demonstrate how these materials may be applied throughout the sign system.

Design Theme

Figures 25 through 28 illustrate the cohesive use of materials and elements themed to complement the design intent.

Figure 25 Example barrier fencing. Design uses durable materials, successfully contains users and minimally intrudes visually on the trail experience.

Figure 26 Example custom bridge elements. Identifying channel crossing creates awareness and appreciation for the natural drainage users are crossing. Sculptural element at bridge approach can be tied into other themed elements throughout the trail system.

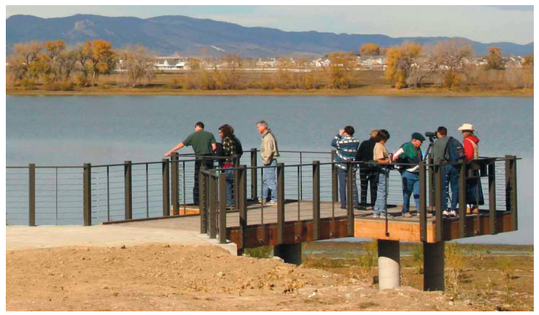


Figure 27 Railings. Railings and guardrails can still meet safety criteria while minimally intruding on the trail experience. Custom railing details at key locations can be tied into the overall theme of the trail system.

Figure 28 Native materials. Use of native materials for walls ties the trail system into the natural environment.

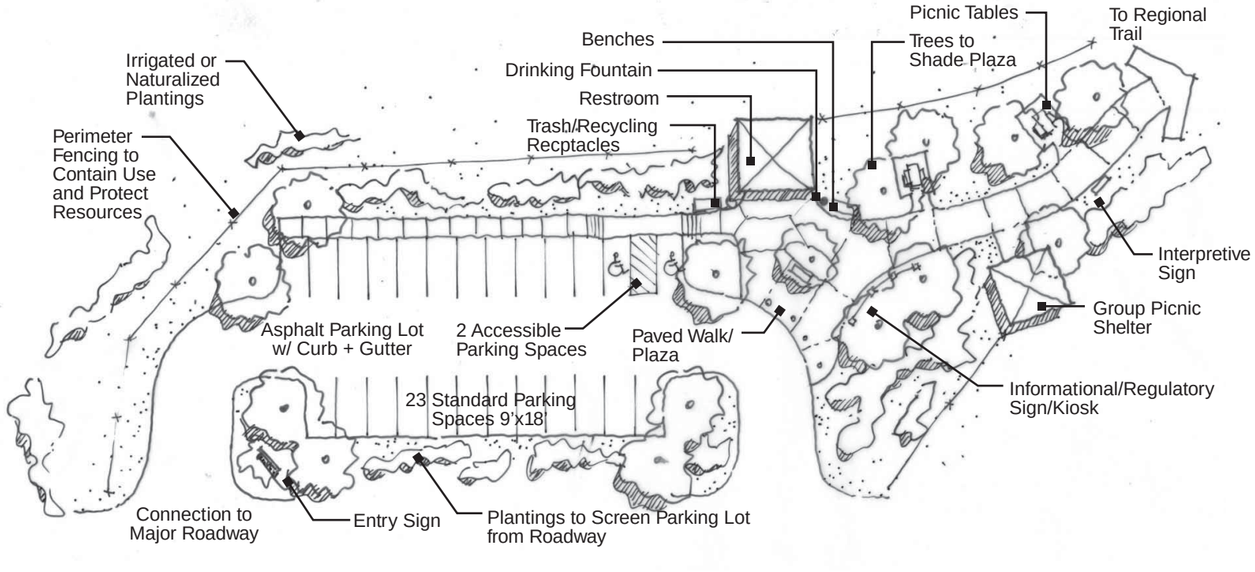


Figure 29 Primary Trailhead with Standard Parking

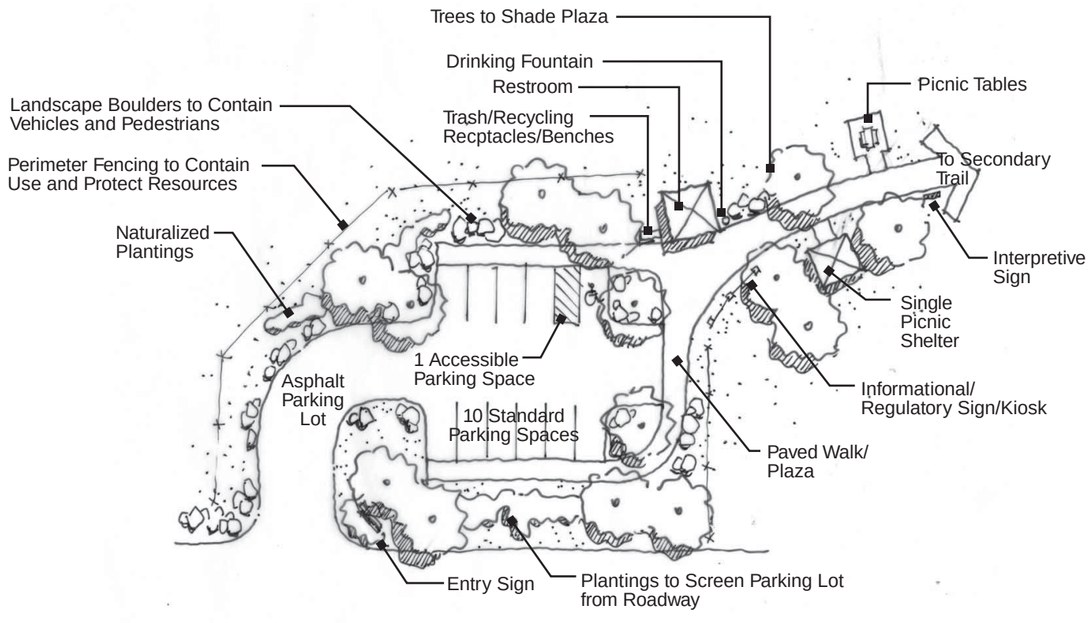


Figure 30 Secondary Trailhead

Trailheads and Trail Waysides

Trailheads provide the first impression for users as they access the trail system. Trailhead locations and sizes are determined by level of anticipated use, classification of trail being accessed, spacing of trailheads and available area for the trailhead itself. In an urban setting, trailheads may often be incorporated into existing parks with only minor physical improvements (see Figure 19). In outlying areas, trailheads should be constructed as stand alone access points. Frequency and location of trailheads should be determined once the trail use and available access points are identified. Access to a primary roadway should be a priority consideration when selecting trailhead locations. Intersections of major drainages and major roadways are often ideal locations for trailheads.

Primary Trailheads should be incorporated where a large number of users are anticipated and should include amenities such as restrooms, picnic shelters, drinking fountains, interpretive and regulatory signs, seating and bike parking (Figure 29).

Secondary Trailheads should occur where a smaller number of users will be accessing a secondary trail (Figure 30). Amenities should include restrooms, picnic tables, drinking fountains, interpretive and regulatory signs, seating and bike parking.

Equestrian parking can be included in trailheads where equestrian use is anticipated, but requires substantially more space than standard parking areas (Figure 31). Hitching posts, water spigots, additional shade and washing areas are other amenities that should be provided at equestrian trailheads (Figure 32).

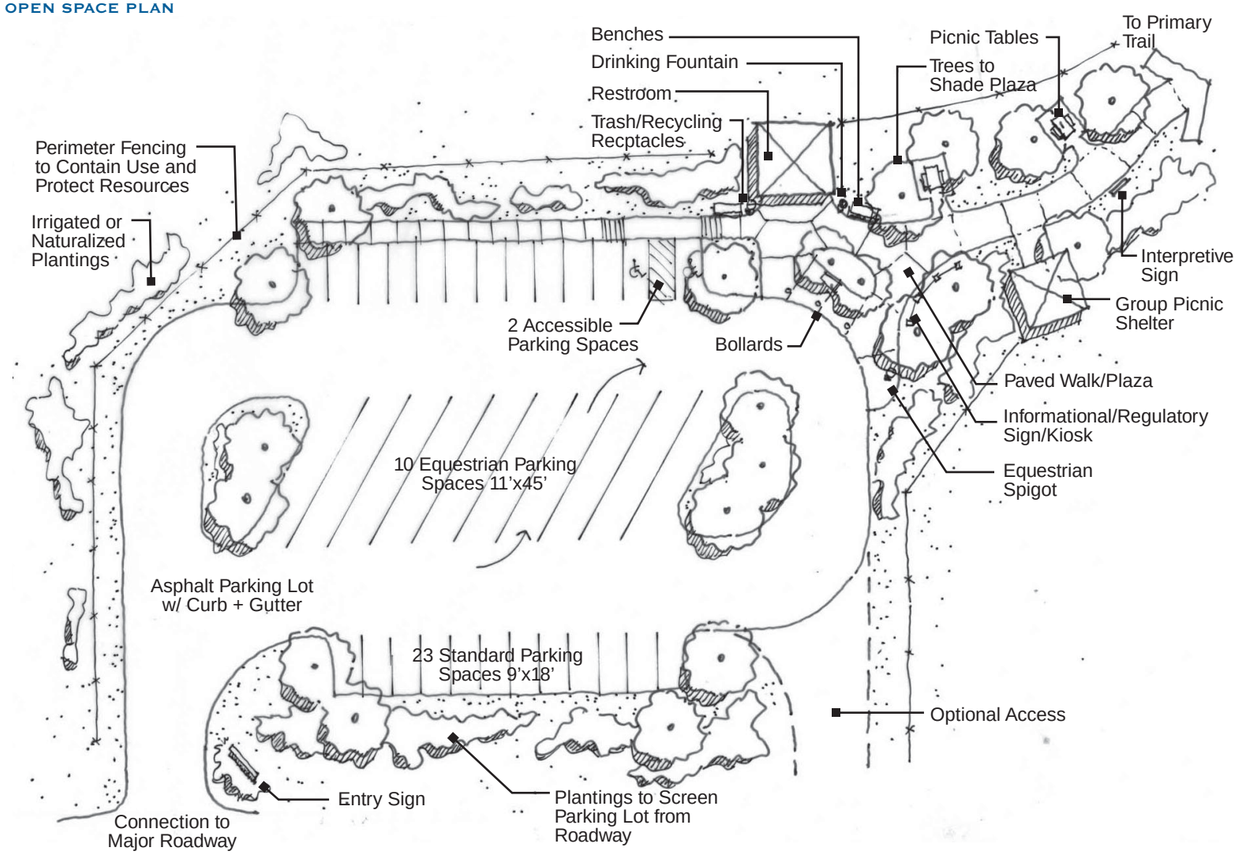


Figure 31 Primary Trailhead w/ Equestrian Parking

Figure 32 Example equestrian amenities. Drinking fountains with jug fillers, spigots and equestrian tie-offs can enhance the equestrian user experience.

Trail Waysides serve as comfort stations along the trail system, but do not provide parking. They are intended to be accessed as a user makes his/her way through a trail system. Waysides provide shade, bike parking, seating and drinking water at intervals that are easily accessed by most users (Figures 33 and 34).

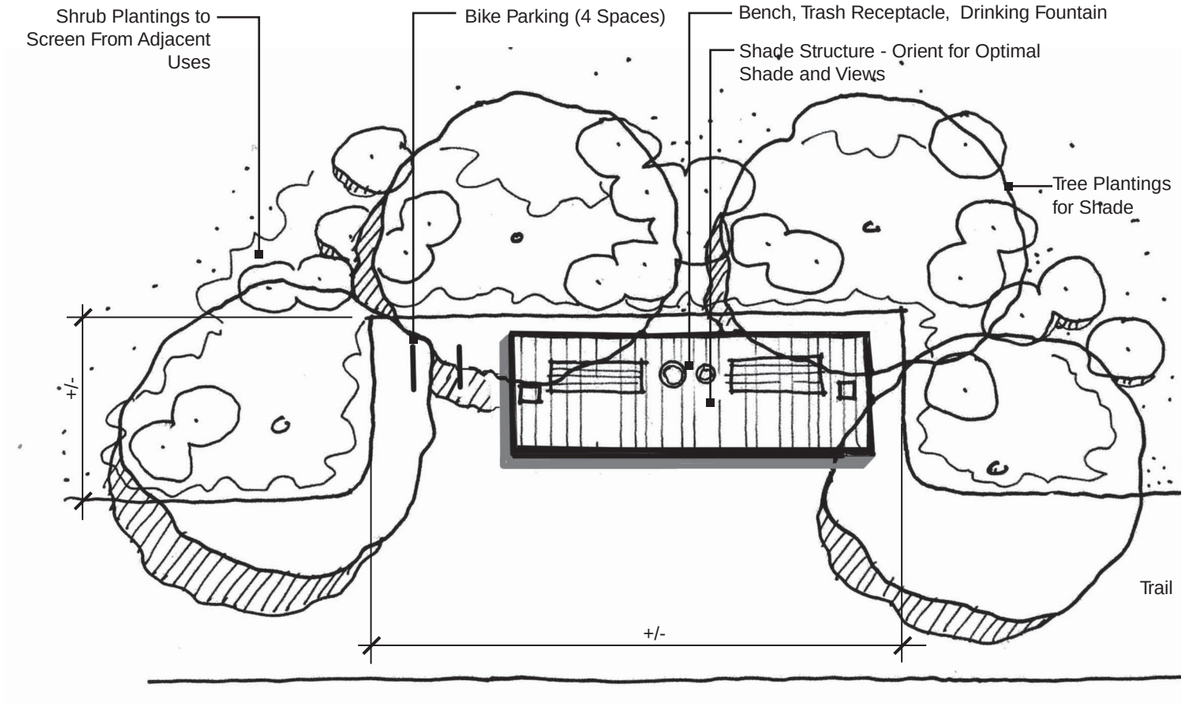

Shrub Plantings to Screen From Adjacent Uses
Bike Parking (4 Spaces)
Bench, Trash Receptacle, Drinking Fountain
Shade Structure - Orient for Optimal Shade and Views
Tree Plantings for Shade
+/-
Trail
+/-

Figure 33 Trail Wayside-Major

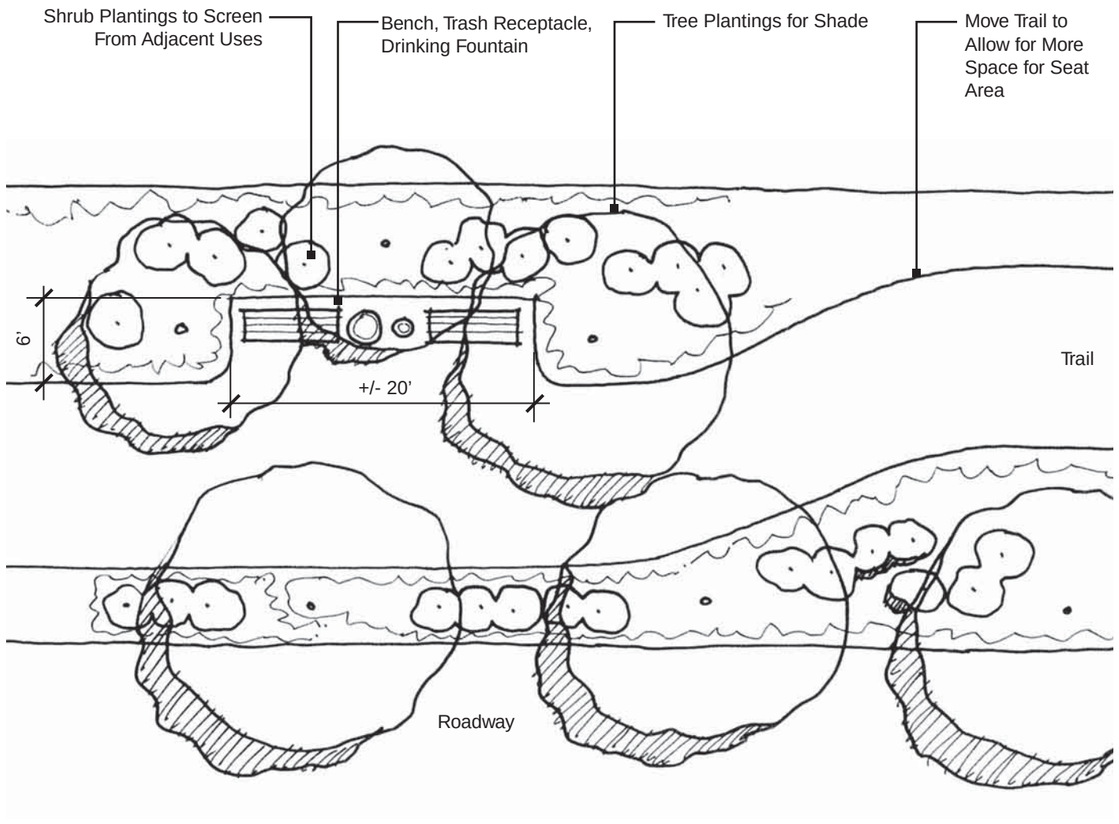


Figure 34 Trail Wayside-Minor

Crossings

Although the trail system will attempt to minimize crossings, especially on Primary Trails, crossings will still exist on collector and local roads at secondary trails. Separated grade crossings will be provided where Primary Trails cross arterial roads and highways (Figure 35). Crossings should be designed to maximize lines-of-sight and visibility for trail users and vehicles. If fully signalized crossings are not possible, pedestrian activated signals are safest and should be used at all higher road classifications or areas where large number of crossings are anticipated (Figure 36). Proper visibility and signage will ensure that non-signalized crossings are also safe (Figure 37).

Figure 35 Separated grade crossings

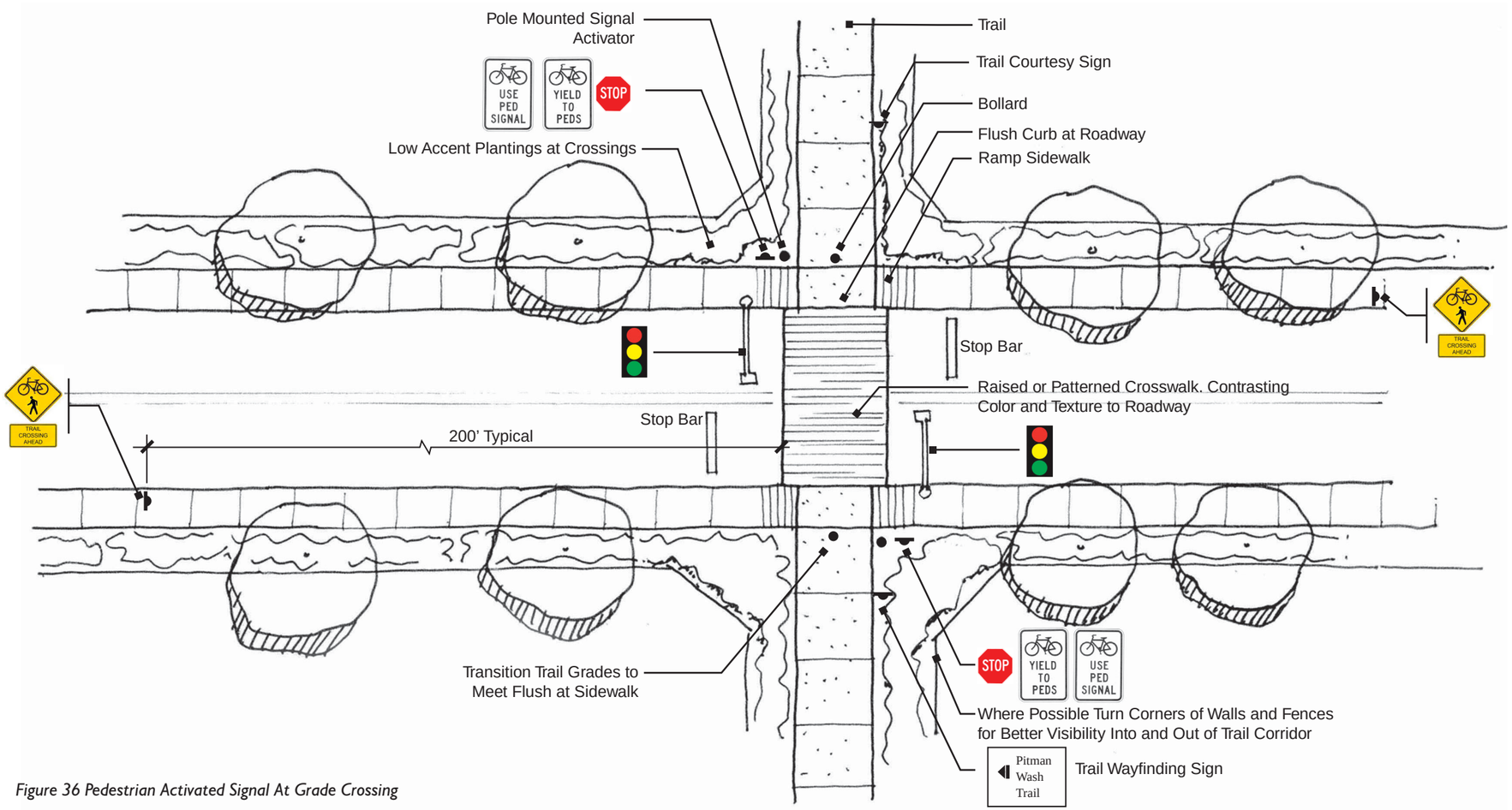


Figure 36 Pedestrian Activated Signal At Grade Crossing

Trail Corridor Landscape

Trails pass through a variety of environments from urban roadsides to suburban neighborhoods and natural desert corridors. Different types of landscape treatments are appropriate for each of these areas. The amount and type of landscape material along a trail greatly impacts the trail experience. The placement of trees at strategic locations provides much needed shade in Henderson's hot desert environment.

Corridors along arterial and other developed roadways should meet and comply with appropriate streetscape requirements. Additional plantings should enhance and compliment the planting concept along the street. The use of native plants and plants requiring minimal water is encouraged.

Open space, drainage, and rail corridors allow for additional flexibility in creating a landscape experience. Generally, these corridors should mimic the natural landscape, including large, irregular, masses of trees and shrubs, rather than formalized rows. Where possible, corridors that have been previously damaged or impacted by development may be reclaimed to convey the natural landscape. Within master-planned communities, homeowners associations typically maintain trail landscaping treatments.

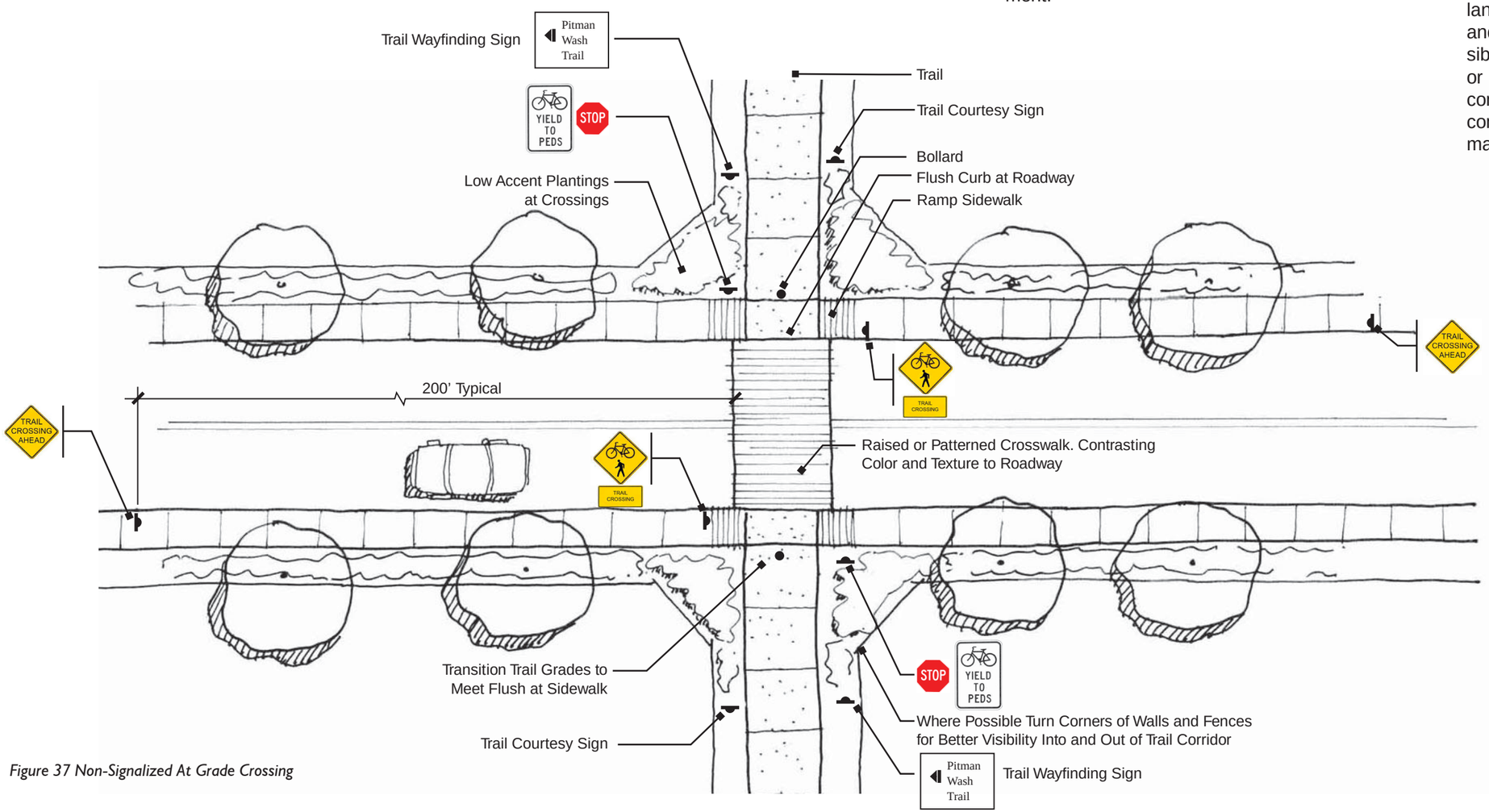

Trail Wayfinding Sign
Pitman Wash Trail
YIELD TO PEDS
STOP
Low Accent Plantings at Crossings
Trail
Trail Courtesy Sign
Bollard
Flush Curb at Roadway
Ramp Sidewalk
TRAIL CROSSING AHEAD
TRAIL CROSSING
200' Typical
Raised or Patterned Crosswalk. Contrasting Color and Texture to Roadway
Transition Trail Grades to Meet Flush at Sidewalk
Trail Courtesy Sign
Where Possible Turn Corners of Walls and Fences for Better Visibility Into and Out of Trail Corridor
Trail Wayfinding Sign

Figure 37 Non-Signalized At Grade Crossing

II. OPEN SPACE AND TRAILS PRINCIPLES AND POLICIES

This section contains decision-making principles and policies that were developed by consensus through worksessions with staff, a Citizens Steering Committee, City Council, Planning Commission, and Parks and Recreation Board, and three public meetings. General concepts from these statements will be incorporated in the 2005 Comprehensive Plan Update.

Like other City programs, ultimate effectiveness of open space and trails efforts is dependent first upon leadership and initiative, and secondarily, upon resources allocated for projects. Principles and policies in this section, and the strategies and action plan in the following chapter are based on the following fundamental assumptions regarding plan implementation:

- City strives to achieve a fair and proper balance among conflicting interests, maintaining a pro-business attitude towards development while protecting natural resources and landscapes of regional and community-wide value.
- Public commitment is long-term and the City will encourage public participation in joint decision-making processes.
- City leadership commitment is long-term (i.e., that findings and strategies will be enforced and supported by Council and public policy).
- The City will collaboratively involve the County, the BLM, and other agencies in joint decision-making processes.
- Neighborhoods and stakeholders most impacted by change will be involved early on in the development process to adapt proposals as needed.
- Support organizations are extensively involved, with advocacy entities empowered to implement projects to further the vision.

Principle 1: Henderson's Open Space System Serves Multiple Purposes

Our community recognizes that the desert environment and natural landscapes add natural beauty to our community, are home to unique wildlife and plant communities, provide ecological functions such as floodways, and provide opportunities for recreation and education for people. Our open space system will conserve resources (including cultural, visual, wildlife, and recreational benefits), provide relief from urban development, and also provide recreation and educational opportunities.

Policy 1.1: Variety of Open Space Types

Henderson has and will continue to plan for a variety of open space types throughout our community, including the "Special Places" (i.e., Regional Preserves, Natural Areas, and Special Resource Areas), "Corridors," and the Desert "Edge" (see Map 3-1: Open Space and Trails Framework Map and Table 3-1: Open Space and Trails Categories).

- **Regional Preserves** are larger areas intended to protect natural, scenic, and recreational values that have community-wide significance (e.g., the Clark County Wetlands Park or Black Mountain).
- **Natural Areas** are smaller protected areas (e.g., the Whitney Mesa Nature Preserve) and other small washes and wildlife habitats.
- **Special Resource Areas** emphasize protection of a specific biological or cultural resource. Public access may be limited or restricted (e.g., the Airport Safety and Noise Attenuation Buffer Area).
- **Corridors** serve recreational, wildlife, and other connectivity goals.
- The **Desert Edge** is the zone where existing or future urban development meets protected desert.

Policy 1.2: Sensitive Lands Protected

Protecting sensitive lands, or lands with distinguishing hillsides and ridgelines, natural drainages and wetlands, known wildlife habitats and corridors, or historic and cultural features, is a priority. These areas should be protected on developing and future development lands, to the greatest extent possible.

Policy 1.3: Recreation Use of Open Space

Allowed recreational uses vary on open space parcels, dependent upon resource sensitivity and management objectives, but some open spaces should accommodate nature-oriented outdoor activities (i.e., hiking, wildlife viewing, photography) and facilities such as trails, trailheads, overlooks, rest areas, and interpretive signage.

Policy 1.4: Open Space as Edges and Community Separator

Open spaces should offer relief and separation between concentrations of development and should provide a natural edge for urbanized areas.

Policy 1.5: Open Spaces Adequately Sized and Configured for Purpose

Open space properties should be of adequate size and configuration to support natural vegetation, wildlife movement and habitat needs, accommodating outdoor recreation needs where appropriate.

Policy 1.6: Open Space Well Distributed to Serve Henderson's Population

Open space properties should be planned in locations and distributed to ensure that the multiple needs of our diverse population are met. Open space, natural areas, and trail corridors should weave through the City's built areas.

Principle 2: Henderson will Have an Interconnected System of Protected Desert Environments

Our open space and trails system should be interconnected, linking natural areas and wildlife habitat areas to parks, schools, neighborhoods, and employment areas through trail corridors and other open space properties. This allows the beauty of our desert environment to become fully integrated into our built environment as the City grows.

Policy 2.1: Connected Natural Areas Instead of "Islands"

The City will work to create a connected system of open space properties, to the extent possible, that follow drainageways, ridgelines, connect habitat areas and other sensitive lands, to avoid "islands in the sky" where parcels are isolated and inaccessible for both wildlife and people.

Policy 2.2: Trail Corridor Connectivity

The City will continue to ensure that trails connect local and County trail facilities, open space properties, neighborhoods, and adjacent Federal Lands, including the Sloan Canyon National Conservation Area.

Policy 2.3: Trail Classifications

Henderson has and will continue to develop a classification system of trails throughout our community, with Primary Trails, Secondary Trails, Equestrian Trails, and Soft Surface Trails.

- **Landmark Corridors** are regionally-significant recreational destinations in and of themselves or lead to recreational destinations (e.g., the Clark County Wetlands Park or Black Mountain). The intent is to provide a unique user experience, as trails of any class (e.g., Primary or Soft Surface) can occur within a Landmark Corridor.
- **Primary Trails** provide access to key community destinations and surrounding communities, most often in non-vehicular corridors. They are meant to accommodate a large number of daily users

and generally are designed for higher speed use than secondary trails.

- **Secondary Trails** support the Primary Trail system by accommodating all users, and often occur within vehicular corridors.
- **Equestrian Trails** occur separately or in parallel with other trail types, allowing equestrian users to safely access trail corridors and recreation destinations.
- **Soft Surface Trails** target hikers, mountain bikers, or equestrian users in mountain or foothill open spaces.

Principle 3: Henderson will Consider Multiple Values in the Design of Storm Drainage Improvements

Henderson seeks ways to better integrate a system of storm drainage channels with a system of trails, parks, open spaces, and other landscapes in our neighborhoods and built environment, without compromising public safety and the proper functioning of the drainage facilities.

Policy 3.1: Coordinated Planning

The planning, design, and construction of storm drainage improvements, trails, parks, and open spaces should occur in tandem, rather than separate events to identify and take advantage of multiple use opportunities afforded by flood control facilities.

Policy 3.2: Adequate Trail Width

In most cases, flood control channels will be designed to provide adequate width for a safe trail and pedestrian amenities.

Policy 3.3 Aesthetic and Recreational Benefits of Flood Control Facilities

Flood control projects will complement and enhance the beauty of our desert environment by providing a combination of aesthetic and recreational amenities, such as natural-appearing channels, wetlands, and native vegetation, as well as traditional park features.

Policy 3.4. Natural Channel Protection

Significant natural washes, arroyos, and waterways will be conserved in their natural state in future growth areas. Explore policies that encourage reduced runoff. On-site detention policies and facilities should be explored to reduce the need for oversized channels.

Policy 3.5: Public Participation in Planning Storm Drainage Improvements

Residents and business owners affected by storm drainage improvement projects will have opportunities to participate in the planning and design process to provide input on recreational opportunities and aesthetics.

Principle 4: Development will Respect the "Desert Edge"

The edge is the zone where existing or future urban development meets protected desert (either Federal, such as Sloan Canyon, or City-owned such as Bird Viewing Preserve). The City will encourage appropriate development at the edge to preserve scenic resources, allow for public access to open space areas, provide "soft" transitions between developed areas and the desert landscape, and maximize the benefit of adjacent public lands to citizens.

Policy 4.1: Desert Edge/Urban Transitions

Land use plans for future development should accommodate urban requirements, encourage context-sensitive design, preserve scenic resources, and set aside sensitive lands at the edge to the extent possible. By creating appropriate transitions between urban and public land, the City can maximize the benefit of adjacent public lands to its citizens without incurring direct management responsibilities and costs.

Policy 4.2: Access to Public Lands at the Desert Edge

Land use plans for future development should accommodate public access from developed neighborhoods to the public lands. New neighborhoods and commercial areas should either maintain historic access to adjacent public lands that will remain public or provide new access.

Principle 5: Our Community will Provide Long-Term Stewardship of our Open Space System

Environmental stewardship is part of our civic consciousness and municipal responsibility. Henderson seeks to integrate washes, floodplains, and steep slopes into future development as natural, open areas and protect and preserve these natural resources for future generations.

Policy 5.1: Natural-Appearing Desert Condition of Open Spaces

Open spaces should be conserved in their natural state, restored, or improved with appropriate native landscaping to retain a natural-appearing condition to preserve the pre-development character of the Mojave Desert.

.

Policy 5.2: Resource Inventory for Future Growth Areas

In collaboration with local, regional, state, and federal agencies, the City will identify sensitive lands and trail corridor opportunities in future growth areas in order to ensure their protection in the annexation and land use planning process.

Policy 5.3: Variety of Open Space Stewardship Approaches

The City will manage its open spaces through a variety of approaches, including establishing Management Plans, establishing adequate funding, and fostering volunteerism, partnerships, and non-profits, and enforcement.

Policy 5.4: Public Education about Mohave Desert and Stewardship

The City will promote public education about open space issues and the desert landscape, including sensitive lands, cultural landscapes, native plants, drainage systems, and other functions of natural and open space areas through interpretation and programming. In particular, the Landmark Corridor system will encourage users to learn about, appreciate, respect, and experience the Mojave desert and access the adjacent Sloan Canyon National Conservation Area

Policy 5.5: Safety in Open Spaces

The City will ensure public safety and appropriate uses on open spaces and trails through proper planning and design, education, monitoring, and enforcement, with emergency access provided in open space areas.

Viewing platform at the Clark County School District Whitney Mesa Preserve. For the past 10 years, Boy Scout, Girl Scout, and other civic groups have partnered with the school district to install trails, overlooks, and teaching areas in the northernmost canyon of Whitney Mesa south of Russell.

III. LIST OF LANDMARK PROJECTS

The illustrated Framework Map identifies a number of priority short- and long-term open space and trail opportunities to assist the community in achieving the open space vision (see Figure X). In particular, these projects will increase quality of life by integrating the beauty of the desert environment into the built environment, contributing to a sense of place, and providing unique recreational experiences. These opportunities where developed, refined, and prioritized through numerous staff and public workshops. While opportunities were not prioritized in statistical model, three opportunities were consistently identified as a subject of great public interest. They are as follows (as numbered on the illustrated Framework Map rather than by order of priority):

- **Sloan Canyon Visitors Center** (2)
- **Black Mountain Regional Preserve** (4)
- **River Mountains** (9)

Detailed descriptions of these three projects are found the following section, and priority actions for each are outlined in the Action Plan in Chapter 5.

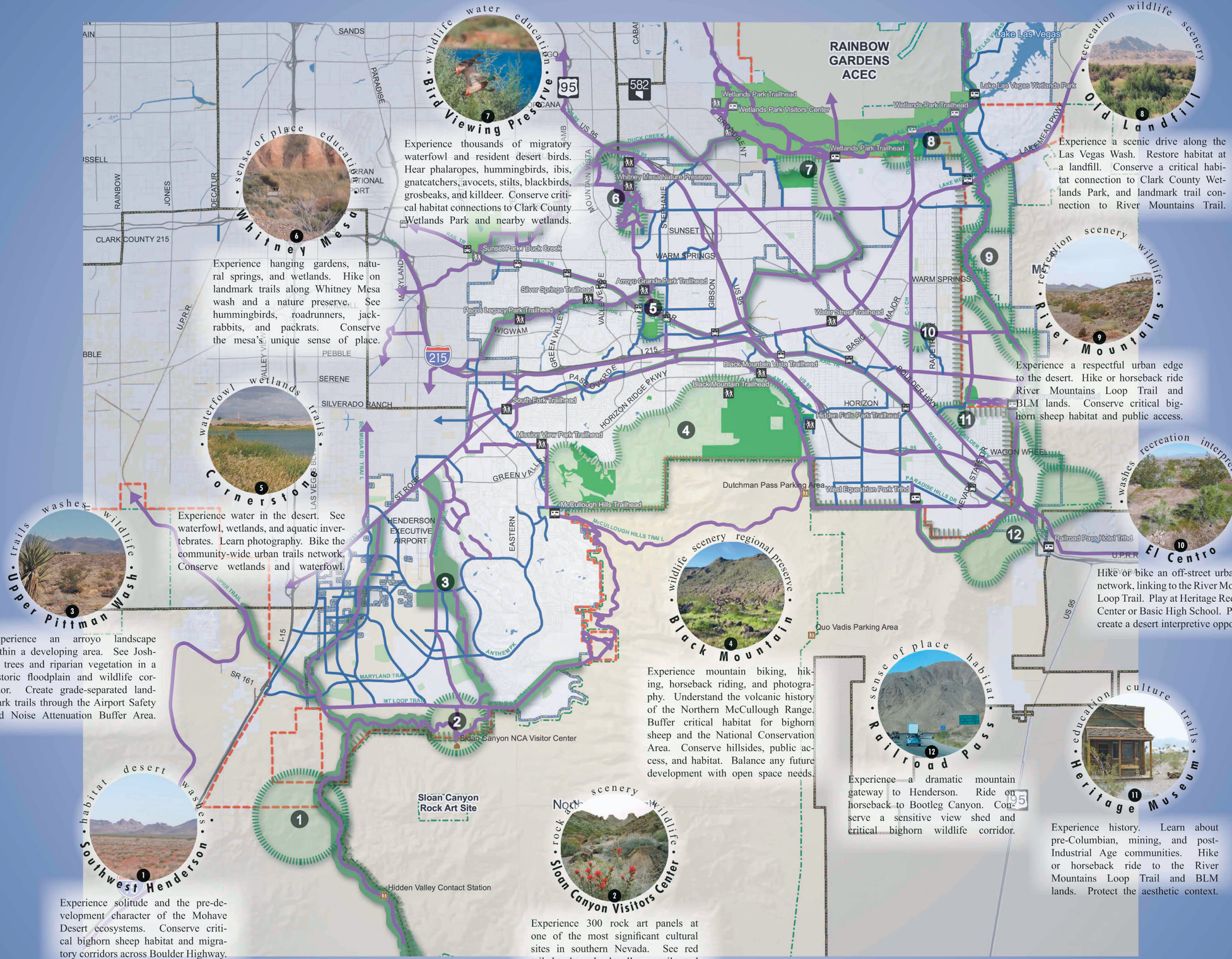
Other landmark projects are listed below. This list is not meant to be all inclusive. New projects should be identified and prioritized annually. Each landmark project includes a brief description of the potential public use opportunities and natural resources to be conserved.

- **Southwest Henderson** (1)
- **Upper Pittman Wash** (3)
- **Cornerstone** (5)
- **Whitney Mesa** (6)
- **Bird-Viewing Preserve** (7)
- **Old Landfill** (8)
- **BLM Quarter Section** (10)
- **Heritage Museum** (11)
- **Railroad Pass** (12)

Considerations for Future Open Space Projects

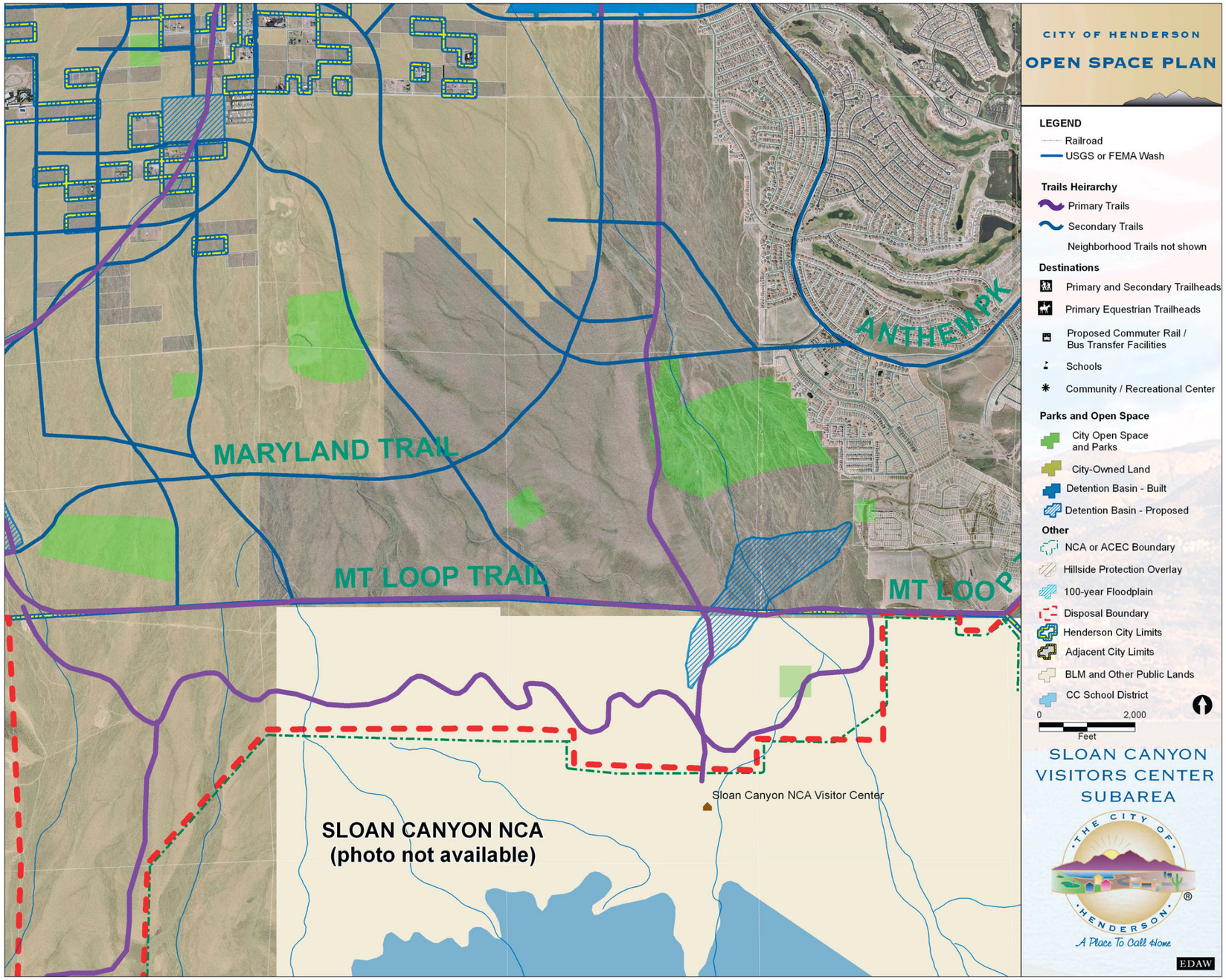
There are often more opportunities to protect sensitive lands than there are partners, staff and funding available. The following questions should be utilized to enable staff to fully assess and prioritize conservation opportunities, while allowing flexibility in implementing the plan. They are intended to serve as a basis for comparing different resource areas in order to determine the priority of acquisition or conservation easement.

1. What is the ecological and cultural value of this property?
2. What are the potential recreational or educational opportunities for this property?
3. What is the threat to the integrity of the property's natural, cultural, or scenic values?
4. What are the estimated long-term stewardship costs for this property?
   a. Initial clean-up
   b. Recreation and Education
   c. Restoration
   d. General maintenance
5. What is the current owner's interest in partnering with the City?
6. What are the potential liabilities or conflicts that may be absorbed by the City or its partners?
7. Based on questions 1-6, explain why conservation of this property would be of significant public benefit to the citizens of the City of Henderson.


RAINBOW GARDENS ACEC
Lake Las Vegas
Lake Las Vegas Wetlands Park
Wetlands Park Trailhead
Wetlands Park Visitors Center
Whitney Mesa Nature Preserve
Sunset Park/ Duck Creek
Arroyo Grande Park Trailhead
Silver Springs Trailhead
Pecos Legacy Park Trailhead
Water Street Trailhead
Black Mountain Vista Trailhead
Black Mountain Trailhead
Hidden Falls Park Trailhead
South Fork Trailhead
Mission View Park Trailhead
Dutchman Pass Parking Area
West Equestrian Park Trlhd
McCullough Hills Trailhead
Railroad Pass Hotel Trlhd
Quo Vadis Parking Area
Sloan Canyon NCA Visitor Center
Sloan Canyon Rock Art Site
Hidden Valley Contact Station
HENDERSON EXECUTIVE AIRPORT
SUNSET
WARM SPRINGS
HORIZON
WIGWAM
PEBBLE
SERENE
SILVERADO RANCH
WAGON WHEEL
SANDS
PARADISE
RAINBOW
JONES
DECATUR
CLARK COUNTY 215
MARYLAND
VALLEY VIEW
GREEN VALLEY
PASEO VERDE
HORIZON RIDGE PKWY
EASTERN
ANTHEM PK
MARYLAND TRAIL
MT LOOP TRAIL
UPPER TRAIL
MCCULLOUGH HILLS TRAIL
LAKE MEAD PKWY
BOULDER HWY
BASIC
RACETRACK
MAJOR
GIBSON
MOUNTAIN VISTA
STEPHANIE
I-15
SR 161
US 95
I 215
582
95
U.P.R.R
Wildlife • water • education • Bird Viewing Preserve • 7
Experience thousands of migratory waterfowl and resident desert birds. Hear phalaropes, hummingbirds, ibis, gnatcatchers, avocets, stilts, blackbirds, grosbeaks, and killdeer. Conserve critical habitat connections to Clark County Wetlands Park and nearby wetlands.
sense of place • education • Whitney Mesa • 6
Experience hanging gardens, natural springs, and wetlands. Hike on landmark trails along Whitney Mesa wash and a nature preserve. See hummingbirds, roadrunners, jackrabbits, and packrats. Conserve the mesa's unique sense of place.
waterfowl • wetlands • trails • Cornerstone • 5
Experience water in the desert. See waterfowl, wetlands, and aquatic invertebrates. Learn photography. Bike the community-wide urban trails network. Conserve wetlands and waterfowl.
recreation • wildlife • scenery • Old Landfill • 8
Experience a scenic drive along the Las Vegas Wash. Restore habitat at a landfill. Conserve a critical habitat connection to Clark County Wetlands Park, and landmark trail connection to River Mountains Trail.
recreation • scenery • wildlife • River Mountains • 9
Experience a respectful urban edge to the desert. Hike or horseback ride River Mountains Loop Trail and BLM lands. Conserve critical bighorn sheep habitat and public access.
washes • recreation • interpretation • El Centro • 10
Hike or bike an off-street urban trails network, linking to the River Mountains Loop Trail. Play at Heritage Recreation Center or Basic High School. Possibly, create a desert interpretive opportunity.
trails • washes • wildlife • Upper Pittman Wash • 3
Experience an arroyo landscape within a developing area. See Joshua trees and riparian vegetation in a historic floodplain and wildlife corridor. Create grade-separated landmark trails through the Airport Safety and Noise Attenuation Buffer Area.
wildlife • scenery • regional preserve • Black Mountain • 4
Experience mountain biking, hiking, horseback riding, and photography. Understand the volcanic history of the Northern McCullough Range. Buffer critical habitat for bighorn sheep and the National Conservation Area. Conserve hillsides, public access, and habitat. Balance any future development with open space needs.
sense of place • habitat • Railroad Pass • 12
Experience a dramatic mountain gateway to Henderson. Ride on horseback to Bootleg Canyon. Conserve a sensitive view shed and critical bighorn wildlife corridor.
education • culture • trails • Heritage Museum • 11
Experience history. Learn about pre-Columbian, mining, and post-Industrial Age communities. Hike or horseback ride to the River Mountains Loop Trail and BLM lands. Protect the aesthetic context.
desert • habitat • washes • Southwest Henderson • 1
Experience solitude and the pre-development character of the Mohave Desert ecosystems. Conserve critical bighorn sheep habitat and migratory corridors across Boulder Highway.
rock art • scenery • wildlife • Sloan Canyon Visitors Center • 2
Experience 300 rock art panels at one of the most significant cultural sites in southern Nevada. See red tail hawks, chuckwallas, quail, and migratory birdsand gila monsters. Protect the wilderness experience.

Access road leading to mouth of Sloan Canyon Rock Art Site.

Boulders, waterfalls, and wildflowers cascade down Sloan Canyon walls in the spring.



Sloan Canyon Visitors Center Subarea

Open Space Category: *Special Place (Natural Area), Edge, Corridor, and Landmark Corridor*

Experience 300 rock art panels at one of the most significant cultural sites in southern Nevada. See red tail hawks, chuckwallas, quail, migratory birds and gila monsters. Protect the wilderness experience.

Description

In 2002, the Sloan Canyon National Conservation Area (NCA) was established "to conserve, protect, and enhance for the benefit and enjoyment of present and future generations its cultural, archeological, natural, wilderness, scientific, geological, historical, biological, wildlife and scenic resources," (Clark County Conservation of Public Land and Natural Resources Act of 2002). The NCA encompasses more than 48,000 acres of BLM land in the McCullough Mountains, within which 14,763 acres comprise the North McCullough Wilderness Area, an area containing a variety of unique geological features and plant communities. The NCA's pronounced ridgelines, which span from 2,000 feet at the eastern base of the range to 5,092 feet at Black Mountain, offer excellent views of the City of Henderson, the entire Las Vegas Valley, and beyond.

The NCA is proposing that their primary entrance and Visitors Center be located at the southern border of West Henderson, where the steep escarpment of the volcanic northern McCullough peaks transition into a gradual western slope. The Visitors Center will be sited at the mouth of Sloan Canyon in order to control access and prevent vandalism. This canyon contains one of the most significant cultural sites in southern Nevada, over 300 rock art panels with 1,700 individual design elements. Archaeologists believe the petroglyphs represent native cultures dating from the Archaic to the historic era.

As visitors approach their recreation destination, research shows that visitors have heightened expectations for the context surrounding the destination. Currently, land within the Disposal Area boundary (adjacent to the Visitors Center site) is BLM-owned, but is anticipated to be released for development in the near-term and the area is identified as a Future Growth Area by the City, with uses prescribed in the West Henderson Plan. This provides an opportunity to create residential and/or commercial areas that enhance the entrance to the historic site. Sensitive viewsheds and unique landforms such as ridgelines and washes should be given high priority during the development review process. Context-sensitive design of City streets, lighting, and other infrastructure should be encouraged. Like Red Rocks National Conservation Area, the Sloan Canyon Visitors Center has the potential to be a major tourist destination and economic driver for the City of Henderson.

Public Use Opportunities

The facilities and activities offered at Sloan Canyon Visitors Center will be elaborated in the final Sloan Canyon Resource Management Plan, to be completed in the fall of 2005. Guided tours will likely be offered to view the petroglyphs in Sloan Canyon. Located within a 15 minute drive from McCarran International Airport, the Visitors Center campus may likely accommodate a library, research laboratories, university offices, and a restaurant in addition to interpretive exhibits. The natural and aesthetic setting in which these facilities are located should be a prime consideration in land use planning.

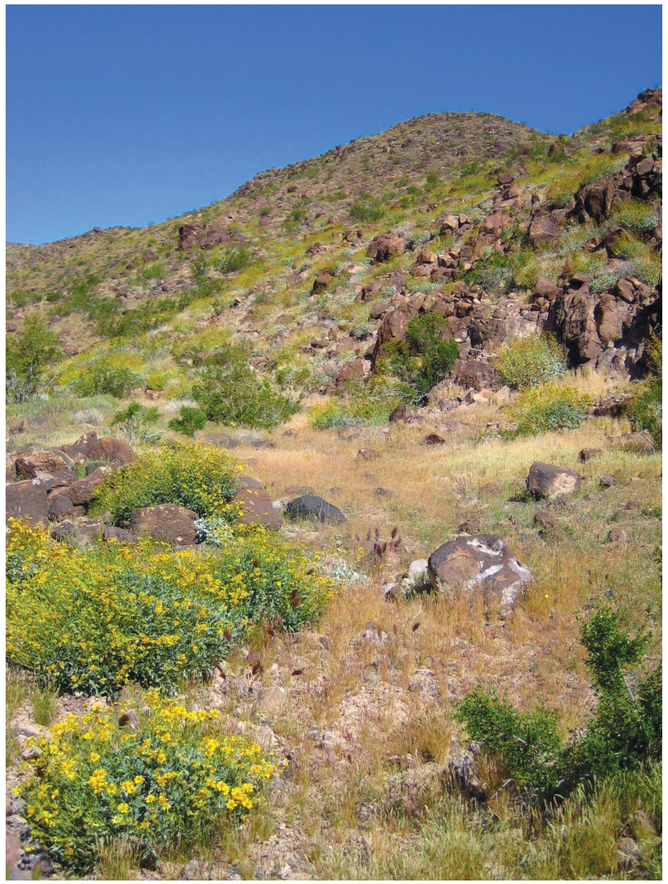
Within Henderson, a Landmark Corridor is planned east-west south of an existing powerline corridor, as well as one vehicular collector road and non-motorized trail leading south to the Visitors Center. Due to the sensitive resources in Sloan Canyon, other motorized and non-motorized access points south into the NCA will be discouraged except as identified on the Sloan Canyon NCA Resource Management Plan. Photography, wildlife and wildflower viewing, and other passive interpretive activities will be encouraged at the Visitors Center.

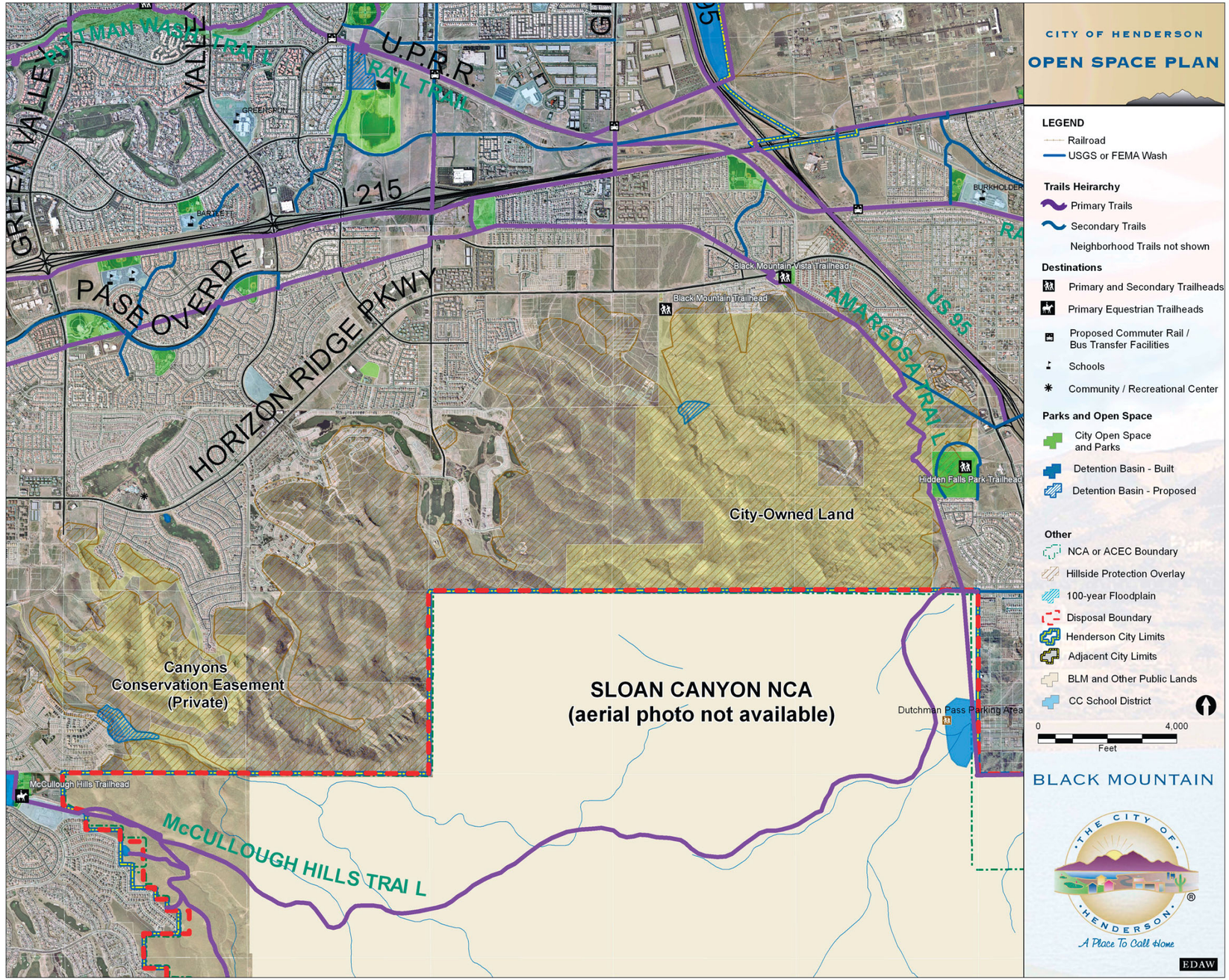
Resource Conservation Opportunities

The Visitors Center area supports a unique combination of plants from the Mohave, Sonoran Desert and Great Basin ecosystems. The primary vegetation is a creosote-bursage community with barrel cactus, Joshua trees, cholla and prickly pear with areas of well-developed desert pavement. The NCA supports black gramma grass, which is not known to occur anywhere else in Nevada and stands of teddy-bear cholla, which is at the northernmost extent of the species. Several special status plant species potentially occur near the Visitors Center, such as White-Margined Beardtongue Penstemon and Rosy Twotone Beardtongue Penstemon. The Nevada Natural Heritage Database contains records for some special status species, and additional populations and species are likely to be located with further surveys.

Images of Sloan Canyon proper. Anthem in West Henderson can be seen in the distance on the lower right.

City-owned land at Black Mountain as seen from a proposed trailhead off of Horizon Ridge.





Black Mountain Regional Preserve

Open Space Category: *Special Place (Regional Preserve), Edge, and Landmark Corridor*

Experience mountain biking, hiking, horseback riding, and photography. Understand the volcanic history of the Northern McCullough Range. Buffer critical habitat for bighorn sheep and the National Conservation Area. Conserve hillsides, public access, and habitat Balance any future development with open space needs.

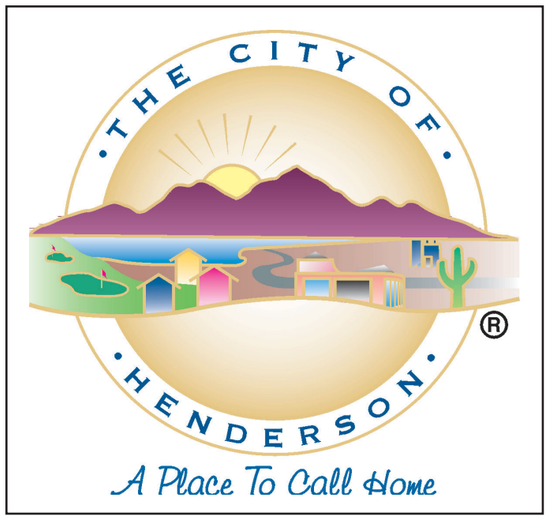
Description

The northern McCullough Range is the most distinctive, visible landscape feature in the City of Henderson, and forms the backdrop to the City's logo. The northwestern slopes of Black Mountain are visible throughout the Las Vegas Valley, and it is a central focal point for tourists approaching the City on I-215 and U.S. 95. It is also one of the only areas within the City limits where one can view bighorn sheep for several months of the year. For this and its other qualities, Black Mountain was repeatedly identified in public meetings as a priority conservation site.

The City owns approximately 1,377 acres of vacant land on the northeastern side Black Mountain within the corporate boundaries adjacent to the Sloan Canyon NCA. Portions of this land were dedicated to the City as "open space" by past developments. Significant opportunities exist to expand City-owned land in this opportunity area through dedications and conservation easements as well as acquisition of buildable private lands in partnership with willing sellers.

The western half of Black Mountain is identified as a Future Growth Area and is zoned to permit residential uses, with several subdivisions at varying stages of completion. Most of the western half of the mountain is privately owned. However, McDonald Ranch, a major landowner, has expressed interest in transferring ownership of unbuildable lands to the City. The remainder of Black Mountain, including City-owned land, is zoned as Development Holding.

Formalizing a management plan for large-scale City-owned lands such as Black Mountain and maximizing opportunities to expand them protects natural and aesthetic values of community-wide significance while also providing opportunities for nature-oriented, outdoor activities. As recreational facilities are developed in Sloan Canyon National Conservation Area, this buffer between private and federal lands will experience increased demands for recreation and access.



City of Henderson logo featuring Northern McCullough Range as backdrop.

Public Use Opportunities

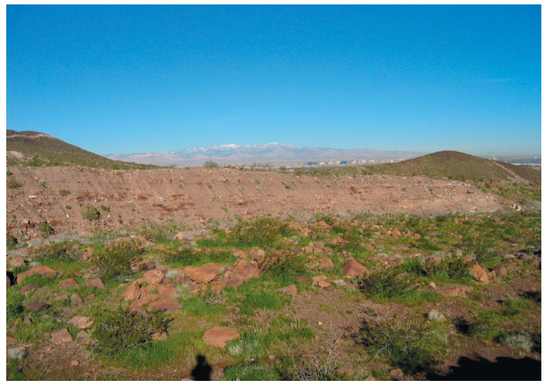
This regional preserve holds a number of unique recreational and interpretive opportunities, such as hiking, mountain biking, horseback riding, photography, and wildlife viewing. Two miles of a Landmark Corridor, the Amargosa Trail, pass through the northeast corner of the opportunity area, and trail improvements are scheduled through recent SNPLMA funding allocations. However, gated communities and limited access points pose a significant challenge to fully accessing Black Mountain.

Convenient, yet controlled, public access to Black Mountain is critical to the success of this regional opportunity. Two City-owned parcels and an easement adjacent to Horizon Ridge Parkway are essential to guaranteeing public access to more remote City-owned lands. These include Hidden Falls Park, Black Mountain Vista Trailhead, and an easement on the south side of Horizon Ridge east of Gibson Road. The Green Valley and nearby neighborhoods of southeast Henderson (further west of these three access points) are underserved by current park facilities. Obtaining ownership or conservation easements of private land from willing landowners in the western portion may permit additional recreational connectivity for these neighborhoods.

Hidden Falls Park is 60-acre park currently under construction, which includes neighborhood and community park amenities in the fast-growing area of Mission Drive. Both passive and active recreational opportunities are planned. The proposed 7.5-acre Black Mountain Vista Trailhead Park is bisected by the Amargosa Trail on Horizon Ridge Parkway east of Paseo Verde. The third City easement lies on a piece of land ideal for a trailhead, with excellent access to gentle slopes and washes.

Resource Conservation Opportunities

This opportunity area has been previously identified as a priority conservation site, such as in the Nature Conservancy's 2001 study, Ecoregion-Based Conservation in the Mojave Desert. The majority of Black Mountain is subject to the Hillside Overlay Zone due to steep slopes and several sensitive ridgelines, as indicated on the 2002 Hillside Overlay Zoning District Map. Black Mountain also meets many of the criteria of the Clark County Environmentally Sensitive Lands Study.

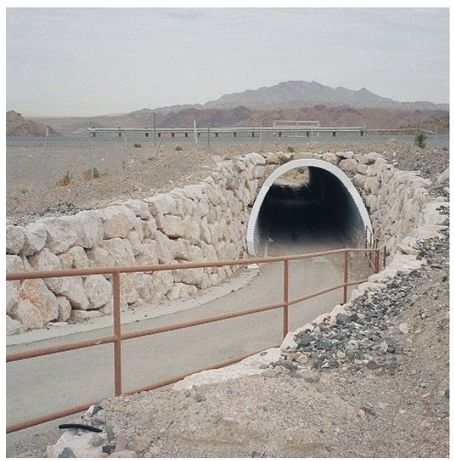


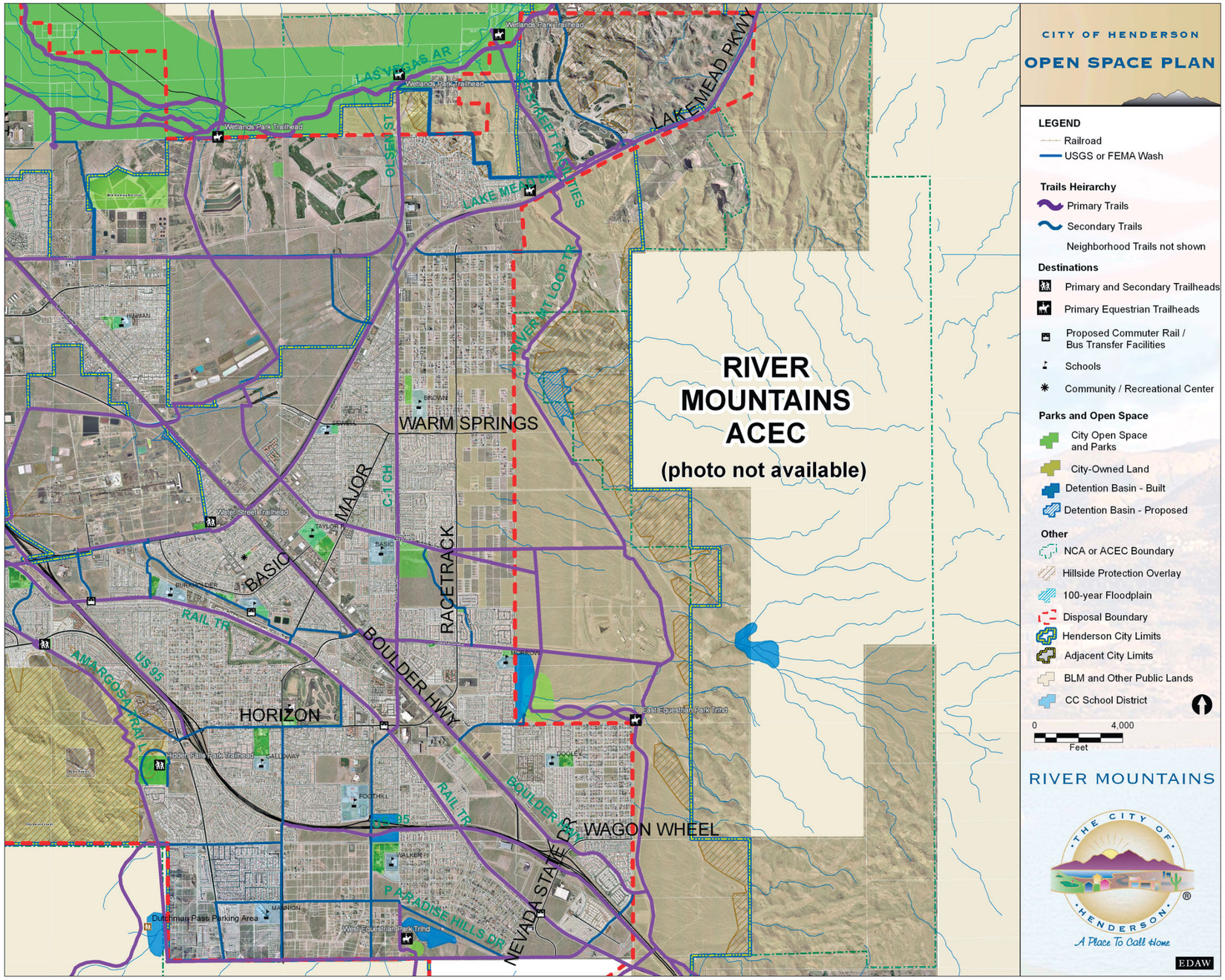
City-owned land at Black Mountain above a proposed trailhead off of Horizon Ridge.

Due to its size, elevation, and varied landscapes types, Black Mountain represents a landscape-scale habitat conservation opportunity in addition to providing an aesthetic backdrop to the City. It provides potential habitat for Gila Monster, Chuckwalla, Desert Tortoise, as well as critical Bighorn Sheep Winter Range. It also creates a critical buffer between the intense urban uses of the Valley and critical habitat contained within the NCA. Trails and other recreational facilities should be designed and located so as to minimize locations to these critical habitats. Continued coordination with the BLM will be necessary to direct trail users to designated entry points to the Sloan NCA.

The River Mountains Area of Critical Environmental Concern (ACEC) provides critical habitat for bighorn sheep, desert tortoise, and a number of other species of concern.

The River Mountains Loop Trail - when completed - will be approximately 35 miles in length and will surround the River Mountains connecting Lake Mead National Recreation Area, Hoover Dam, Henderson, Boulder City and the rest of the Las Vegas Valley, The segment nearest Henderson opened in 2005, shown here at Lake Mead Boulevard.





River Mountains

Open Space Category: *Special Place, Edge and Landmark Corridor*

Experience a respectful urban edge to the desert. Hike or horseback ride River Mountains Loop Trail and BLM lands. Conserve critical bighorn sheep habitat and public access.

Description

Eastern Henderson includes land that is designated as an Area of Critical Environmental Concern (ACEC) by the BLM. The River Mountains ACEC comprises approximately 11,000 acres of land, of which 640 acres extend into the eastern part of the City. The River Mountains were formed by lava erupting from small volcanoes nearly 5 million years ago and were shaped by water down-cutting its way to the Colorado River. Today, the River Mountains provide the scenic viewshed for Henderson and Boulder City and the ACEC protects valuable habitat for the Desert Tortoise and Desert Bighorn Sheep.

Public Use Opportunities

The River Mountains provide neighboring communities with a suite of recreation opportunities. Photography, bird-viewing, biking and hiking are among the most popular activities in the River Mountains. In 1996, the River Mountains Trail Partnership began planning and development for a 35-mile loop trail to surround the River Mountains connecting Lake Mead National Recreation Area, Hoover Dam, Boulder City, Henderson and the rest of the Las Vegas Valley, thereby expanding recreational and alternative transportation opportunities for the region's growing population. The trail, portions of which are completed nearest Henderson, is intended to be multi-use, multi-jurisdictional, and non-motorized. Upon completion, the trail will link residential areas to local and regional parks and trails, and will also link natural and cultural resources while providing outdoor education opportunities focused on the uniqueness of the River Mountains landscape. The completed trail will accommodate mountain bikers, horseback riders, and hikers (www.rivermountainstrail.com).

Nearby Bootleg Canyon features a world-renowned 36-mile network of cross-country and downhill mountain bike trails, most built along the slopes of an ancient volcano cone, which challenge both beginner and expert cyclists. Users include local residents and international visitors. Just as Bootleg Canyon provides wonderful recreation opportunities for Las Vegas and Boulder City residents, the River Mountains and River Mountains ACEC could provide numerous recreational experiences for the City's residents (www.bootleg.org).

Resource Conservation Opportunities

The River Mountains ACEC supports a number of sensitive resources which led to its federal designation. Within the ACEC, approximately 6,000 acres are designated for conservation of the federally threatened Desert Tortoise. Clark County completed a Multiple Species Habitat Conservation Plan and Environmental Impact Statement that outlines the management guidelines for tortoise habitat within the ACEC. In addition, the ACEC supports one of the largest desert bighorn sheep populations in the region as part of the McCullough Range. Calico Ridge also supports unique and endemic plants. Finally, the River Mountains, in their entirety, forms the scenic backdrop for the eastern side of the Las Vegas Valley.

Quail along a wash in northeast Henderson

Other Opportunity Areas

Southwest Henderson (Ivanpah Valley)

Open Space Category: *Special Areas (Regional Preserve), Edge, Wildlife and Trail Corridor*

Experience solitude and the pre-development character of the Mohave Desert ecosystems. Conserve critical bighorn sheep habitat and migratory corridors across Boulder Highway.

Description

With future growth constrained by Wetlands Park to the north, River Mountains ACEC to the east, and Sloan Canyon to the south, the remaining developable land in West Henderson and Southwest Henderson will likely accommodate the majority of Henderson's future population. This future growth area of influence includes the area surrounding the Rinker Site, the I-15 corridor Las Vegas Boulevard, and the northernmost portions of Ivanpah Valley and Hidden Valley beyond Henderson's corporate limits.

To the visitor, little has changed between the Las Vegas Valley and unincorporated village of Jean (population 125) in the last 100 years, or so it seems. Bordered by I-25 on the west and Sloan Canyon NCA to the east, the area's flat valley and steep mountain character is reminiscent of Henderson's presettlement times. With the exception of casino and airport development near Jean, the area has historically been hidden from Valley development, aptly named Hidden Valley. With the exception of distant rumble of mining trucks and interstate traffic, Ivanpah and Hidden Valley's landscapes – like most of the Mojave Desert – are vast, open, and surprisingly quiet with the exception of distant rumble of mining trucks and interstate traffic. The area's flat valley and steep mountain character is reminscent of Henderson's presettlement times. The creosote-dotted landscape runs to the horizon, broken only by utility corridors, off-road vehicle roads, and gravel mining. In addition to the mountaineous horizon, notable landmarks in each valley are ephemeral lakes (Dry Lake and Jean Lake) which can completely inundate close to 2.5 square miles during a single 100-year storm event and often attract playa waterfowl in the early spring.

Recreational Opportunities

This is a newly developing area where open space and trail connectivity opportunities can be addressed up front and integrated into the development plan. Enhanced trail connectivity will be provided in this area, including links to the regional system via St. Rose Parkway and through future trail development to Sloan Canyon via the Mountain Loop Trail. The Sloan Canyon NCA Resource Management Plan proposes a visitor's center south of West Henderson and a contact station and trailhead in Hidden Valley as a secondary access for Sloan Canyon's main rock art trail system.

As this area forms the southernmost boundary to the Las Vegas Valley, it is an important visual gateway into the Las Vegas and West Henderson for tourists and residents alike. Many open house attendees have called for growth in the Las Vegas Valley to not sprawl uninhibited into these adjacent valleys, but instead should be defined by the preservation of important open space that provides a boundary to each community.

Resource Conservation Opportunities

Portions of this future growth area were identified as a priority conservation sites in The Nature Conservancy's 2001 study, Ecoregion-Based Conservation in the Mojave Desert, and Clark County's Environmentally Sensitive Lands Advisory Committee Report in 2004. These environmentally sensitive lands should be incorporated into land use plans as they are updated. Generally, lands that are environmentally sensitive can best be protected by remaining in public ownership.

Mountains and hills in Southwest Henderson are quite steep – most exceeding 15% slopes or more – and provide nesting grounds for raptors and the McCullough herd of bighorn sheep. During the hot summer months, bighorn sheep rely on Department of Wildlife maintained water developments and rarely travel more than five miles from available water. Preserving connectivity between these water developments and to the Spring Mountains west of I-15 is critical to maintaining viable populations of bighorn sheep. Rosy two tone beardtongue penstemon, white-margined beardtongue penstemon, and desert tortoise are known to occur throughout the area. This area also contains habitat for chuckwalla, quail, and gila monster.

Hidden Valley (above) and Ivanpah Valley with Jean Lake (below)

Upper Pittman Wash (Airport Safety and Noise Attenuation Buffer Area)

Open Space Category: *Special Resource Area and Corridor*

Experience an arroyo landscape within a developing area. See Joshua trees and riparian vegetation in a historic floodplain and wildlife corridor. Create grade-separated landmark trails through the Airport Safety and Noise Attenuation Buffer Area.

Description

This opportunity area is the result of the proximity between the Henderson Executive Airport, Pittman East Detention Basin, a 102-acre BLM parcel, and the upper Pittman Wash floodplain.

As described in Chapter 2, the BLM will be managing a 102-acre Bearpoppy Conservation Area of unimproved land adjacent to the Henderson Executive Airport for the noise and safety buffer purposes for a minimum of 30 years. To the east of the BLM parcel lies the 180+ acre Pittman East Detention Basin along the headwaters of Pittman Wash. Approximately half of the site is developed as a detention basin, and the remainder features intact vegetation.

According to the draft conceptual land use planning for this area, a business park is planned south of the airport and Bearpoppy Conservation/Airport buffer area. To the west, residential and industrial uses are planned.

For 2 ½ miles, upper Pittman Wash flows virtually unimpeded north through the Airport Overlay Zone. Pittman Wash enters the BLM parcel and detention basin on the south; further north it acts as a buffer between the Henderson Executive Airport and the Anthem community. according to the Executive Airport Plan (adopted 2004), much of this land will remain open for public uses. The Clark County Flood Control District Master Plan and West Henderson Plan propose channelizing upper Pittman Wash in order to maximize the development potential of the adjacent floodplain.

Public Use Opportunities

Large washes in West Henderson, especially those that comprise the 100-year floodplain such as upper Pittman Wash, offer a logical opportunity to maintain trail and habitat connectivity as development occurs in this rapidly-growing subarea of the City. Protection of the wash's landscape features can provide an open space spine connecting throughout the community to parks, neighborhoods, and employment centers.

Together, the BLM land, detention basin, and airport overlay zone can create a significant open space node along this Landmark Corridor. At first glance, the hard-edged detention basin is unlikely to provide a recreational experience, and public access near the airport must also be controlled. However, together they form a large, unique node of open land along what could be a contiguous Landmark Corridor in what will soon be a highly urbanized subarea. Consultation with the BLM, Henderson Executive Airport, Anthem Development, the Flood Control District, and other developers will be required in order to maintain the continuity of a community-wide recreational experience afforded by this opportunity.

Resource Conservation Opportunities

With the exception of the Henderson Airport and Rural Preservation neighborhoods, this region of the City is predominantly undeveloped and contains large tracts of undisturbed vegetation. It currently provides habitat for Desert Tortoise and likely contains potential habitat for species found in nearby Sloan Canyon, such as White-Margined Beardtongue Penstemon and Rosy Twotone Beardtongue Penstemon.

As development envelopes the area, the Airport Safety and Noise Attenuation Buffer Area, Pittman East Detention Basin, and the Henderson Executive Airport will take on an elevated importance ecologically and visually as a distinctively open patch of habitat. Its ecological value can be enhanced by ensuring contiguity between each use, as well as habitat corridor connectivity south to the NCA and north to Pittman Wash.

Vegetation at the BLM Bear Poppy Conservation Area.

Upper Pittman Wash's floodplain scours a 1000' wide swath through West Henderson. This floodplain and others in future growth areas form the skeleton of a city-wide landmark corridor system - connecting to lower Pittman Wash at Pecos, shown above left.

Cornerstone Lake Redevelopment Area

Open Space Category: *Special Place (Natural Area), Corridor, and Landmark Corridor*

Experience water in the desert. See waterfowl, wetlands, and aquatic invertebrates. Learn photography. Bike the community-wide urban trails network. Conserve wetlands and waterfowl.

Description

The Cornerstone Redevelopment Area stretches from U.S. 215 north across the Union Pacific Railroad (UPRR) to Arroyo Grande Community Park. Infrastructure is currently being installed to prime the site for redevelopment, including grading around the 20-acre Cornerstone Lake which will be transformed into a community park with SNLMPA funding. A preliminary concept plan for Cornerstone Lake Park has been prepared, but will require additional public input and engineering prior to being finalized. Approximately one-third of the redevelopment area lies within the 100-year floodplain. In addition to Cornerstone Lake, which will mitigate flooding, a 16 acre detention basin is planned between the lake and the railroad. Wetland edges along the lake attract a variety of migratory and native waterfowl, which in turn attract neighboring residents and birdwatchers.

Regional Fixed Guideway stations are proposed along the UPRR at Arroyo Grande and Stephanie. The Cornerstone Redevelopment Area land use plan indicates commercial uses along Stephanie and residential uses to the west adjacent to existing neighborhoods, several of which are at various stages of development. While the 2004 land use plan does not reflect the Cornerstone Lake Park or detention basin, it does recommend a linear semi-public area that connects the lake to the railroad continuing north to Arroyo Grande Park. The City Parks Department owns two parcels north of the UPRR which would enable a critical off-street north-south connection between these two parks.

Public Use Opportunities

The Cornerstone Lake Area concept is an example of a less formal natural area within an actively programmed park. Residents currently use Cornerstone Lake for bird watching and photography despite its incomplete status; this reinforces the interpretive learning opportunities available. A perimeter trail could encircle the lake, and a boardwalk trail could be developed to provide access to a portion of the wetlands. Uses and facilities should be designed to provide an appropriate transition between the natural area and active uses. Due to water quality concerns, swimming and wading will likely be prohibited at Cornerstone Lake.

In addition to these active recreation uses, the Cornerstone vicinity should form a hub for this district's trail system. These trails (from north to south) include the Pittman Wash Landmark Corri, UPRR (Primary), American Pacific Drive (Secondary), Wigwam Trail (Secondary), Wigwam Parkway (Secondary), and Amargosa Trail (Primary). It will be important to identify a safe bicycle-pedestrian crossing over I-215 in order to connect Cornerstone with the Amargosa Trail. Most of these trails can feed directly into the proposed Regional Fixed Guideway transit stations. The undeveloped nature of the area provides an excellent opportunity for off-street trail alignments and connections for those trail segments still in the planning stage.

Resource Conservation Opportunities

As a community park is developed, preserving and restoring the existing wetland edge to the lake should be a priority in order to provide a unique lake experience. In this desert environment, these wetlands are highly valuable to waterfowl, and offer opportunities for habitat conservation and wildlife observation, featuring unique habitat for both aquatic and terrestrial species. An appropriate buffer distance will be maintained around the edge of the lake and a series of observation platforms provided with interpretive signage. While maintaining a more natural-appearing edge to the lake poses some new challenges, safety and accessibility can be accommodated through the proper design and maintenance of facilities.

Trail users can connect between Cornerstone Lake and Arroyo Grande Park under an existing UPRR bridge (above right). Waterfowl and wetlands at the in-process redevelopment site gives an indication of the future potential of this waterbody for habitat and interpretation.

Whitney Mesa Subarea

Open Space Category: *Special Area (Natural Area), Corridor, and Landmark Corridor*

Experience hanging gardens, natural springs, and wetlands. Hike on landmark trails along Whitney Mesa wash and a nature preserve. See hummingbirds, roadrunners, jackrabbits, and packrats. Conserve the mesa's unique sense of place.

Description

Whitney Mesa is a highly-visible, environmentally-sensitive area that is rich in historic and cultural resources, wildlife habitat, unusual geology, and natural springs. Prehistoric remains, characteristic of the Pinto-Gypsum Period (7000-1500 B.C.) and the Virgin Anasazi Period (100 B.C. to present), as well as early Euro-American settlement remains, are present in the Whitney Mesa area.

Most notably, Whitney Mesa is distinguished for its unusual geologic formation stretching from Sunset Road north to Russell Road in an otherwise highly urbanized area of the Valley. As a result of the uplift, seeps and springs stain its canyons with green, red, and grey vegetation, and year-round flows maintain highly productive riparian zones, attracting a wide variety of wildlife. Beehives and bird nests in the cliffs, raptors soaring overhead, and frequent mammal sightings such as packrats and jackrabbits make this area a favorite for wildlife enthusiasts. Wetlands, a high water table, and shallow bedrock are present on the southern end of the mesa near Sunset Road.

Due to its unusual geology, the Clark County Comprehensive Plan Conservation Element designates the area as having severe to moderate foundation stability limitations. The Hillside Protection Overlay Map identified sensitive ridgelines and slopes over 15% along the mesa. This Zoning Overlay was established to preserve the scenic quality of the hillside terrain by promoting development compatible with the natural characteristics of hillside terrain, such as degree of slope, significant landforms, soil suitability and existing drainage patterns.

The effects of urbanization are evident along the mesa. Illegal dumping has left car bodies mangled at the bottom of slopes, and off-road vehicle use has destroyed vegetation along the escarpment. Development has also occurred at the mesa, including schools, churches, and neighborhoods line the base of the mesa and industrial and office buildings line its top. In 2004, the City approved a commercial office park south of Southern Nevada Vocational and Technical College Campus along the rim of the mesa, and rezoned 60 acres adjacent to Sunset Drive for residential use at its base.

Public Use Opportunities

As shown in Table 3-3, 8,870 students attend school within walking distance of the Whitney Mesa's interpretive opportunities. Clark County School District owns and maintains 307 acres of the northern portion of Whitney Mesa, of which 100 acres lie within the city limits. Since 1991 the school district has led cleanup efforts to remove old cars, trash, and invasive species such as tamarisk from the canyons nearest Truman White Middle School. Over the past 10 years, Boy Scout, Girl Scout, and other civic groups have partnered with the school district to install trails, overlooks, and teaching areas in the northernmost canyon of Whitney Mesa south of Russell, called the Whitney Mesa Nature Preserve. The School District has prepared field trip tours, a curriculum guide and an informational CD about the learning objectives available at the site. The students' interest in the natural area has been highlighted in numerous newspaper and television spots.

Table 3-3. Schools within walking distance of Whitney Mesa (2002-2003 Clark County School District enrollment figures).

School	2002-2003 Enrollment
Green Valley High School	2,976
Cowan Academic	378
Southern Nevada Vocational Technical Center High School (SNVTC)	1,795
Thurman White Middle School	1,701
Harriet Treem Elementary (3-5)	658
Jim Thorpe Elementary (K-2)	693
McDoniel Estes Elementary	579
Total	**8,780**

In 2003, the City received $1,673,250 in Round 4 SNPLMA funding to protect another canyon (also named Whitney Mesa Nature Preserve) from further damage and future development pressures in this growth area. The Preserve, approximately 6 acres in size southwest of Thurman White Middle School, would include a network of nearly one mile of recreational biking and hiking trails. The project would provide educational opportunities for area students, residents and visitors. Photography and geology field trips and programs could also be accommodated.

Between the proposed 60-acre residential area and the existing neighborhoods along Sunset Road is a City-owned park of 20 acres that is in the master planning phase. In addition to providing activity facilities, it is envisioned that the park will embrace the existing natural features of the site including its hydrological and topographical challenges.

Resource Conservation Opportunities

As existing residential and institutional uses already have consumed most of the developable land at Whitney Mesa, and the northernmost portion is managed by the Clark County School District, the primary opportunity lies in protecting and restoring aesthetic, biological, and hydrological resources as residential and office development occurs near Sunset Road. These vacant lands are highly visible from Sunset Road and are frequently used as a "commons" by residents from nearby neighborhoods. Of particular concern is the impact of development to the sensitive ridgeline as visible cuts may be necessary in order to accommodate the proposed uses. A Landmark Corridor with accessible grades north-south along the base of the mesa should be accommodated. The City-owned 20-acre park site, like Cornerstone Lake, should accommodate passive and active uses with appropriate transitions between each.

Portions of this southern area are dominated by riparian vegetation as they lie with a 100-year floodplain. Whitney Mesa Wash, a steady flowing perennial stream, is bordered in some areas by wetlands. Preliminary studies indicate that flood control improvements, including up to two detention basins, may be necessary in order to protect proposed development. Sensitivity to the site's unique wetlands and riparian vegetation should be a given high consideration as surface water is one of the defining characteristics of the area.

As mentioned earlier, office uses have been approved for the summit of Whitney Mesa. Ample setbacks, colors, and site planning should minimize the visual dominance of new buildings along the rim per the Hillside Overlay and sensitive ridgeline requirements. There is also an opportunity to coordinate with Clark County (Whitney) and the Clark County School District to conserve the sensitive ridgelines and slopes northwest of the City limits.

Whitney Mesa with riparian corridor and wetlands in the foreground.

Bird-Viewing Preserve

Open Space Category: *Special Place (Natural Area), Wildlife and Landmark Corridor, Edge*

Experience thousands of migratory waterfowl and resident desert birds. Hear phalaropes, hummingbirds, ibis, gnatcatchers, avocets, stilts, blackbirds, grosbeaks, and killdeer. Conserve critical habitat connections to Clark County Wetlands Park and nearby wetlands.

Description

Officially dedicated in May 1998, the approximate 90-acre area includes lagoons, ponds, and reclaimed water facilities that provide a protected nesting and feeding habitat for over 200 resident and migratory bird species. The Preserve utilizes the City Wastewater Reclamation Facility's (WRF) evaporation ponds. As the third largest body of water in Southern Nevada, the ponds provide irresistible habitat to a wide variety of native and migratory birds. The Preserve is the culmination of over 20 years of use of the facility by birders and the effective combination of public and private interests working together for mutual community and environmental benefits.

Public Use Opportunities

There are nine ponds available for birding, surrounded by both paved and dirt paths. The paved path is approximately 3/4 of a mile long. The dirt paths are level and allow for easy walking. The City has printed a brochure for the visitors, with a list of species sighted at the ponds, in order to make the viewing experience more enjoyable. The Preserve provides the public with an opportunity to see and learn about birds and an opportunity to educate visitors on wastewater treatment and ecology.

Resource Conservation Opportunities

The Preserve is home to thousands of migratory waterfowl as well as numerous resident desert birds. The Preserve has created safe bird habitat and provided naturally occurring food sources for resident, migratory, and nesting birds. The Preserve supports a great diversity of birds including seasonal migrants and desert resident species. Several bird species were identified as having migrated to the tip of South America and back each year. The evaporative ponds, among the largest water bodies in the state, also provide habitat to a number of other aquatic species. The surrounding desert environment makes these ponds an area of exceptional habitat value. The Preserve provides a wonderful opportunity to educate visitors on birds, as well as the importance of and enjoyment associated with conservation (http://www.cityofhenderson.com/parks/facilities/BVP/php/BirdPreserve.php).

School children and bird enthusiasts flock to the Henderson Bird Preserve. Protecting and restoring additional lands around the Preserve will enhance its connectivity to the Clark County Wetlands Park.

Old Landfill

Open Space Category: *Special Place (Natural Area), Wildlife and Trail Corridor*

Experience a scenic drive along the Las Vegas Wash. Restore habitat at a landfill. Conserve a critical habitat connection to Clark County Wetlands Park, and landmark trail connection to River Mountains Trail.

Description

The Henderson Landfill site was closed during the mid-1970's and preliminary assessment and site inspections were completed during 1991-1996. The State of Nevada Department of Environmental Protection is leading a clean-up effort on the site in coordination with the City Environmental Management and Property Management Divisions.

Public Use Opportunities

As done in other communities across the country, the landfill site may be redeveloped to provide a future recreational opportunity for the city. The City has explored the feasibility of a golfcourse at the site and preliminary plans have been developed. Due to the existing drought conditions in Southern Nevada, the development of a golf course may not occur during the immediate future.

In addition to golf course opportunities, the site may also provide for trails access to the Wetlands Park. Trails are planned around the perimeter of the golf course site and adjacent to the C1 Channel. Additionally, a shared-use path is planned adjacent to Sunset Park to provide for additional access.

Resource Conservation Opportunities

The Wetlands Park Master Plan suggests that properties located within 1000-feet of the wash should include a greater emphasis on habitat conservation. Since the landfill site is located within 1000-feet of the Park, restoration efforts to encourage habitat should be explored. Additionally, the City's plans to partner with the Audubon Society to provide for restoration and habitat areas should be furthered.

Areas south of Wetlands Park near the Old Landfill hold tremendous scenic, recreational, and wildlife value.

El Centro

Open Space Category: *Special Place (Natural Area), Landmark Corridor*

Description

Hike or bike an off-street urban trails network, linking to the River Mountains Loop Trail. Play at Heritage Recreation Center or Basic High School. Possibly create a desert interpretive opportunity.

A portion of one quarter-section will likely be transferred to the City for public uses between S. Pueblo Boulevard and Racetrack Road at Coronado Drive. The quarter-section is across from Basic High School, which has two baseball fields, a multi-use sports field, and track-and-field facilities. Cinnamon Ridge Neighborhood Park, an existing 7-acre park directly to the north, provides a playground, picnic areas, basketball courts, multi-purpose fields, tennis courts, and restrooms.

Despite some off-road vehicle use, the majority of the site features undisturbed creosote-shrub cover, with a wash extending northwest through the site from Bureau of Reclamation lands.

Public Use Opportunities

The proposed alignment of the Burkholder Trail crosses the northern portion of the site within the Nevada Power utility corridor. It would provide a necessary four-mile connection from a proposed multi-use path at Lake Mead Drive to River Mountains Loop Trail and adjacent federal lands. The City received $1,606,710 from SNPLMA Round 4 funding to construct the 12-foot wide primary trail which will include landscaping, lighting, signage, and other trail amenities. A near street secondary trail along the C-1 Channel is planned north-south along S. Pueblo Boulevard. Duran Trail, an existing secondary trail, enters the site at the south along the wash and can connect Burkholder Trail to Hoover Basic Trail, a primary trail ½ mile south. Emphasizing off-street connectivity to the Burkholder Trail would provide an option for alternative transportation with an economically disadvantaged area.

The City received $7,392,000 in 2004 SNPLMA funding for Heritage Community Recreation Area, and a number of uses are proposed for the site although a master plan has not been developed. Potential uses include a 60-acre active park that may include an indoor sports complex and aquatic center, sports fields, equestrian uses, a dog park, group ramadas, picnic areas, parking areas and lighting, outdoor water features, and restrooms. Residential development and public facilities such as fire and police buildings may also be located in the vicinity according to the East Side Land Use Plan. Even with these uses, ample area remains for a more passive, natural experience that requires less maintenance and infrastructure. Capitalizing on the wash, trail system, and views of the River Mountains to the east should be considered. Consideration should further be given to a discovery park or botanical garden, such as X found in North Las Vegas. The site's adjacency to Basic High School will allow students and teachers to maximize learning opportunities at the site, similar to programs currently conducted at Whitney Mesa.

Resource Conservation Opportunities

Historically, a 900 foot, 100-year floodplain flowed freely from south to north across the site, and the soils and vegetation show signs of recent flooding. Today's floodplain may be more confined due to construction of the Equestrian Detention Basin at Magic Way. This provides an opportunity to conserve the wash as a landscape feature and provide an enhanced experience by extending Duran Trail north along the wash. Large existing creosote and arroyo plant communities can also remain in a natural state as already disturbed portions of the site accommodate more intense uses.

Undisturbed lands on the BLM Quarter-Section hold potential as an interpretive site, located across the street from Basic High School's 2,000 students.

Heritage Museum

Open Space Category: *Special Place (Natural Area)*

Experience history. Learn about pre-Columbian, mining, and post-Industrial Age communities. Hike or horseback ride to the River Mountains Loop Trail and BLM lands. Protect the aesthetic context.

Description

The Clark County Heritage Museum offers a look into the humble beginnings of southern Nevada. Prehistoric dioramas, an ancient pueblo, Native American collections, and a walk-in mine filled with desert minerals allow the visitor to learn about and experience southern Nevada before the Age of Entertainment. Visitors can also discover informative exhibits on mining, transportation, business, and gaming. The gaming exhibit features historical photos of the Strip and gaming-related merchandise, including matches, ashtrays, Keno cards, name tags and a collection of swizzle sticks.

Outside, on "Heritage Street", historic buildings have been restored. Highlights include: the Townsite House, one of 1,000 built for the Basic Magnesium Inc. employees who built the city of Henderson as a bomb production plant during World War II; the 1931 Boulder City train depot which supposedly sees more traffic now than in the year it was open; vintage automobiles; and a half-mile nature trail to a resurrected ghost town.

Ancient creosote communities provide a fitting context for the Heritage Museum's interpretive program. The Museum also features a garden representing plant species endemic to the Mojave Desert.

The Museum lies in an infill area and is surrounded by tracts of publicly-held, yet unprotected land that adds greatly to the historical context. The Museum also could be an interpretive node along the City's trail system (linking to the River Mountains Loop Trail) if adequate signage and trail connectivity were provided.

Public Use Opportunities

The Clark County Heritage Museum provides tourists and local visitors with a relaxing, education alternative to the Strip while still maintaining the gaming theme that has come to define the greater Las Vegas area. Special exhibits, group tours, self-tours, and presentations are offered; exhibits are constantly changing.

Resource Conservation Opportunities

The Clark County Heritage Museum provides and opportunity to preserve historical and cultural resources. For example, the museum recently acquired the historic Grand Canyon Airlines Ticket Office. The office will be joined by thirteen railroad cottages used to house railroad workers. The museum, through its existing exhibits, acquisition of new artifacts, and its efforts to educate visitors, ensures that the cultural heritage of southern Nevada will be preserved.

For more information, visit *http://www.vegas.com/attractions/outside_lasvegas/ccmuseum.html?f=m0at&t=outvegas* or *http://www.co.clark.nv.us/parks/Clark_County_Museum.htm.*

Railroad Pass

Open Space Category: *Special Place (Natural Area), Edge*

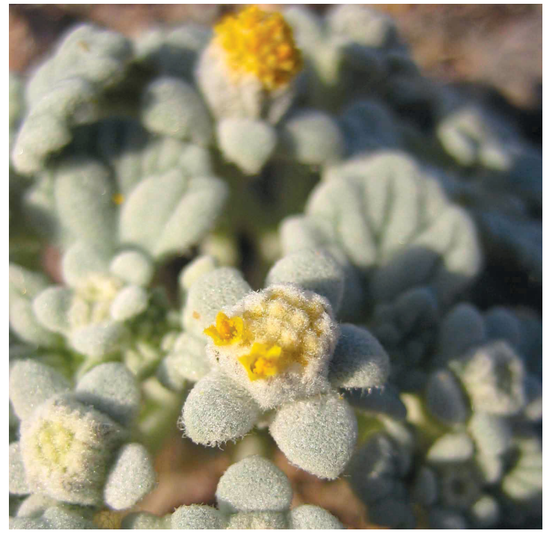
Experience a dramatic mountain gateway to Henderson. Ride on horseback to Bootleg Canyon. Conserve a sensitive view shed and critical bighorn wildlife corridor.

Description

When approaching from Boulder City, a visitor's first image of Henderson is framed by the towering peaks at Railroad Pass. Railroad Pass is an important part of southern Nevada's history as a mining center and early community encampment. It historically has produced minor amounts of gold, silver, and lead. Alunite is also present in the district, but has not been successfully developed. The steep terrain and dramatic entry experience form a natural and logical urban edge to the City and Las Vegas Valley.

The Pass is also one of the only wildlife corridors between the McCullough Mountains and River Mountains for bighorn sheep and other large mammals. The Nevada Department of Wildlife is investigating installing a wildlife crossing at Boulder Highway in order to facilitate wildlife movement.

The Vineyards Conservation Easement (29 acres) protects the scenic and wildlife resources at the gateway to Henderson. Additional lands can be conserved to maintain bighorn movement across Boulder Highway.



CHAPTER 4:
STRATEGIES

If we are to create a sustainable world – one in which we are accountable to the needs of all future generations and all living creatures – we must recognize that our present forms of agriculture, architecture, engineering, and technology are deeply flawed. To create a sustainable world, we must transform these practices. We must infuse the design of products, buildings, and landscapes with a rich and detailed understanding of ecology.

Sim Van der Ryn and Stuart Cowan
Ecological Design, 1996

INTRODUCTION

Although principles and policies have been determined and key open space and trail projects have been identified, a formal process for implementing these plans is necessary. This chapter is designed to provide a range of implementation actions, strategies, and tools to achieve the Open Space and Trails Vision. Rarely does a "one size fits all" approach work for an open space program, and each section seeks to balance flexibility and discretion with predictability in how the various tools are applied. Strategies are organized as follows:

I. Open Space Protection Strategies
II. Storm Drainage Strategies
III. Trail System Strategies
IV. Land Management and Stewardship Strategies
V. Financing Strategies
VI. Conclusion

Each strategy utilizes at least one of many available tools (i.e., conservation easement, zoning). As there are hundreds of tool variations available, a literature review of tool applications in desert environments can be found in Appendix B. The purpose of this chapter is not to simply replicate a list of potential tools, but rather to organize and focus implementation efforts first on feasible *strategies* that are most likely to succeed, relying on the appropriate *tools* as necessary. These strategy elements, while general in nature, are responsive to the planning objectives, existing conditions analyses, market opportunities, the Framework Plan, and community input.

I. OPEN SPACE PROTECTION STRATEGIES

Supporting Principles and Policies	
Policy 1.2	Sensitive Lands Protected
Policy 1.4	Open Space as Edges and Community Separator
Principle 2	**Henderson will have an Interconnected System of Protected Desert Environments.**
Policy 2.1	Connected Natural Areas Instead of "Islands"
Principle 4	**Development will Respect the "Desert Edge."**
Policy 4.1	Desert Edge/Urban Transitions
Policy 4.2	Access to Public Lands at the Desert Edge
Policy 5.2	Resource Inventory for Future Growth Areas

Planning Tools

Recommendation 1: Maintain a Database of Natural Resource Occurrences

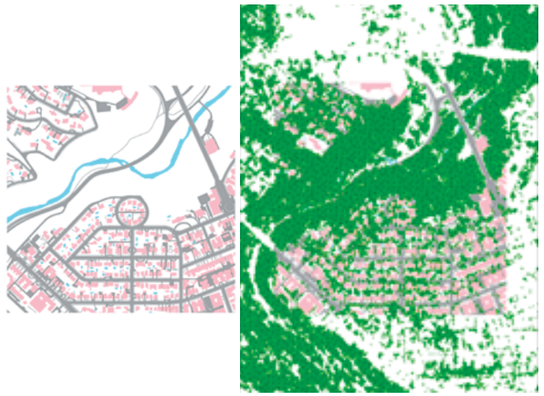
Completion of the Open Space and Trails Plan is only one step in the protection of important resource areas and the development of a regional trails system. The City should continue to add and maintain a regional database of natural resources within the City and in future growth areas in order to evaluate growth management decisions. Natural resources that can be mapped include significant drainages, slopes, historical cultural sites, critical wildlife habitats and corridors, sensitive ridgelines and landforms, geological hazards, springs and wetlands, and floodplains. The Natural Resources Map presented in Chapter 2 is an example of such an in-progress reference map, and should be updated biannually. The MSHCP program and Nevada Natural Heritage Program can provide annual updates of critical habitat and sensitive species data for land use planning, although confidentiality agreements limit public distribution of some information. For example, Appendix C: GIS Data Sources and Analyses of the MSHCP lists over 50 available datasets that could better inform City decision-making. Additional data gaps and resource inventories may be funded through the Clark County Desert Conservation Program, draft interlocal agreements, community groups (i.e., Audubon Society), or partnerships with agencies such as Nevada Department of Wildlife.

Recommendation 2: Identify Sensitive Lands on Future Public Disposal Properties and Future Growth Areas

The City should work with BLM and other agencies to establish a process for identifying, delineating, and protecting sensitive lands as open space prior to future public land auctions and zoning of new annexations. The administrative procedures for this recommendation will require further discussions between the City and BLM, in order to determine the proper mechanisms for this to occur, which may include the utlilization of Recreation and Public Purpose (R&PP) leases and right-of-ways. The intent of this strategy is to ensure that sensitive areas are set aside for protection and that the development community is aware of these areas prior to land sales. Further, this policy is intended to promote the establishment of an interconnected open space system within future development areas. In addition, the City should consider procedures to work with developers to identify areas to be set aside as open space during initial land use planning stages.

Recommendation 3: Integrate Green Infrastructure Planning into the Future Land Use Planning Process

Similar to gray infrastructure (transportation, flood control, utilities, etc.) and other essential community support systems, green infrastructure should be carefully planned, designed, and protected in advance of land auctions, zoning, and development in order to minimize infrastructure costs of developing gray infrastructure. Green infrastructure plans should identify conservation values and ecosystem services (infiltration, flood storage, water quality, etc.) in concert with land development, growth management, and built infrastructure planning rather than in isolation from—or even in opposition to—development. Green infrastructure plans can reduce opposition to new development by assuring civic groups and environmental organizations that growth will occur only within a framework of expanded conservation and open space lands.



A planimetric map of a Washington DC neighborhood shows a neighborhood's gray infrastructure including buildings and roads (left). Classified high-resolution satellite imagery adds a green infrastructure data layer (trees and other vegetation) with its associated environmental benefits (right). (Source: American Forests.)

In consultation with public land agencies, conduct hydrological and landscape analyses to identify lands that can maximize green infrastructure benefits (i.e., floodplains, greenways, conservation areas, and other sensitive lands) or that are unsuitable for future growth (i.e., mountainous areas, BLM Areas of Critical Environmental Concern, unsuitable soils, and faults). These land resources form the core of a green infrastructure plan that can be consulted during the annexation, comprehensive planning, and future land use planning processes. High resource value lands that are not annexed or auctioned can continue to provide scenic, ecological, and recreational benefits to the City, while minimizing fiscal, political, and infrastructure challenges. Sensitive lands that are annexed should be assigned a zoning district or overlay that protects the targeted resource, and should be represented as a distinct open space category in land use plans. The City should acquire or protect through other mechanisms lands in future growth areas where additional nature-based passive uses, such as regional parks, nature preserves, or trailheads are needed.

Recommendation 4: Require Disclosure of Site-Specific Natural Resources

The Hillside Overlay District requires that development plans within the Overlay identify the location of slopes above 15% and sensitive ridgelines. The City should consider requiring that site plans provide an inventory of site resources (i.e., identify local occurrences of natural resources such as washes, significant landforms, historical or cultural features, critical wildlife habitats and corridors, geological hazards, and/or springs and wetlands) that occur within or adjacent to the property prior to entitlement. The intent of this disclosure is to minimize impacts to natural amenities.

To streamline this process in development reviews, the natural resources GIS database (Recommendation 1) can be linked to the parcel database (KIVA), allowing staff to query parcels for any occurrences of natural resources within a property under review, and involve an open space coordinator as necessary.

Recommendation 5: Consider Preliminary or Conceptual Hydrology Study Concurrently with Development Approvals

The current development process allows for a hydrology study to be completed and grading permits issued in advance of traffic studies and development approvals. As a result, grading permits are issued for flood control structures that are independent of information related to a project. Therefore, opportunities for natural drainage facilities and adjacent trails are often not considered. Additionally, grading activities may destroy habitat, significant landforms, and other resources, therefore grading activities should be limited prior to a preliminary hydrology analysis. Consider requiring conceptual hydrology analysis to be completed concurrently with development approvals to allow a more comprehensive analysis of opportunities to incorporate the drainage system and trails into project designs. Identify opportunities and perform early planning in order to effectively coordinate hydrology needs with other departments and agencies.

Regulatory Tools

Recommendation 1: Strengthen Natural Resource Protection Provisions

A. Sensitive Lands Overlay District

The Henderson Development Code (the "Code") currently contains a Sensitive Lands Overlay District (§19.6.10). The City Council is able to invoke the District regulations on a case-by-case basis, "upon its own initiative or upon the recommendation of the Planning Commission," in which case the standards for this district supersede all other regulations applicable to the underlying land. However, the Overlay District does not provide much guidance on when to apply certain standards, as related to certain resources.

This plan recommends broadening the sensitive lands protection provisions to apply to any property that contains sensitive lands as identified through inventory mapping including but not limited to floodplains, streams, washes, wetlands, habitats of species of concern, or known cultural sites. The City could also consider additional protection standards so that sensitive resources are not developed, such as buffer and setback requirements, limitations for certain uses and activities, and other protections. In order to retain flexibility, the City Council could have the option to waive these requirements on a specific property, subject to specified criteria that establish the basis for a waiver. In addition, the Sensitive Lands Overlay could be used to more clearly identify areas of protection in future growth areas (BLM disposal lands), as described above.

B. Strengthen Hillside Overlay District

The Code also regulates land development to moderate development of mountains, foothills, and mesas that exhibit steep slopes, unstable rock, and sensitive ridgelines with a Hillside Overlay District (§19.5.9). Like the Sensitive Land Overlay, this Overlay is invoked by the City Council, Planning Commission, or by petition of property owners. Where the City has initiated the designation, the owner of property containing slopes of 15% or greater is subject to development standards contained in this section of the Code, which reduces development potential as steep slopes increase. The Overlay allows for the transfer of development densities/site disturbance between lands within and outside a sensitive ridgeline setback (100' from designated ridgeline). The Hillside Overlay District moderates density of development on slopes of greater than 15%, but it does not restrict grading, road building, or building on slopes. It may be more effective to designate the steepest slopes (i.e., 15% or greater or some other range) as sensitive lands and regulate them through the sensitive land protection provisions, as discussed above.

This plan recommends broadening the Hillside Overlay District protection provisions to apply to any property that contains sensitive ridgelines or slopes of 15% or greater as identified through inventory mapping. In order to offer further protection to hillsides in future growth areas, these steep slopes and other sensitive lands areas should be identified prior to the nomination for land auction. Within future land releases, lands with slopes greater than 15% should be excluded from the auction process or identified as areas for preservation. In order to retain flexibility, the City Council could have the option to waive these requirements on a specific property, subject to specified criteria that establish the basis for a waiver.

Recommendation 2: Integrate Open Space Recommendations and Requirements into Subdivision and Master Plan Development Proposals

Open space and related environmental assets should be one of the primary considerations during development planning, review, and approval, rather than a secondary consideration. Conditions of approval for development proposals would continue to be an effective tool in achieving plan recommenations. Except for the hillside ordinance, the current Subdivision standards do not provide specific open space delineation or set aside requirements. This plan recommends considering amending relevant sections of the Code to address this issue. For example, the City could explore additional Subdivision Design and Improvements requirements for an open space set aside requirement and criteria when appropriate where a sensitive land area exists, such as natural washes, or steep slopes as inventoried in accordance with Recommendation 1 above. In addition, the Subdivision standards could be amended to provide criteria for management of open space through Homeowner Association groups or other private entities and development agreements.

Recommendation 3: Change to Efficiency Lot Overlay to include Usable Park Areas and Natural Areas Towards Open Space Requirements

The current Efficiency Lot Overlay allows for increased densities with provisions for enhanced design standards and the dedication of additional "usable open space". However, developers are not encouraged to preserve natural drainage facilities or provide more passive open space since these amenities are not considered under the current definition of "usable open space." Consider expanding the definition of usable open space to include natural areas that are not usable.

Recommendation 4: Consider Developing Design Standards or Guidelines to Address Development at the Desert Edge

Consider amending the Code to add regulations or guidelines to guide the design of development adjacent to the edge (see examples on opposite page). Such "edge" regulations or standards should address when edge provisions would apply (e.g., they could be applied through an overlay whenever a property is within a certain range or distance from a protected open space property). Guidelines should also include criteria for visual and recreational access and land use compatibility by addressing site analysis and resource delineation, lower densities or transitions, density transfer or clustering, architectural design, public access, and other considerations. Potential guidelines and tools should be collaboratively developed with the public, land management agencies, and development community. Such a tool either could be regulatory or administered on an incentive-basis; whereas, developers are awarded credits for sensitive design or open space set-asides.

Recommendation 5: Protect the Natural Resources that the City Already Owns

The City of Henderson owns approximately 322 parcels of land for a total of 4,746.19 acres. Approximately 72% of the parcels owned by the City of Henderson are for flood control, municipal uses, or open space. The Framework Plan identifies approximately 2,100 acres currently owned by the City that may meet open space criteria. The City should develop written guidelines and/or management plans for parcels ultimately identified for open space.

Recommendation 6: Provide Consistency Between Definition of "Open Space" in this Plan and Regulatory Definitions

This plan defines "open space" as:

> *... a system of interconnected protected lands. It includes lands that remain generally undeveloped and retain a natural or natural-appearing condition. Open space areas provide resource conservation, visual, wildlife, or recreational benefits. These lands may be conserved in their natural state or improved with appropriate native landscape. Allowed uses vary depending on resource sensitivity.*

The Code includes definitions for "Common Open Space, and Usable Open Space." In general, "common open space" in the Code: means:

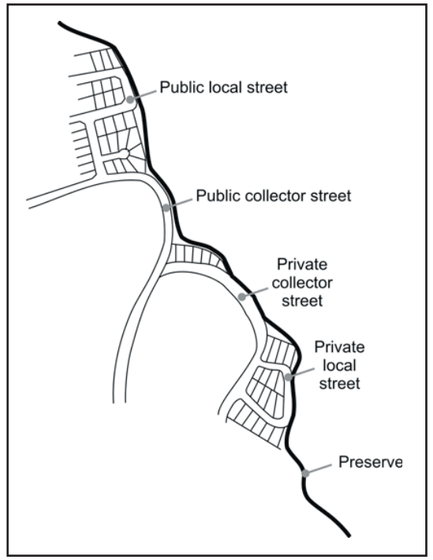
> *... a parcel or parcels of land, an area of water or a combination of land and water within the site that is designated and intended for the use or enjoyment of the residents or owners of the development. "Common open space" may contain such complementary structures and improvements as are necessary and appropriate for the benefit and enjoyment of the residents or owners of the development.*

To eliminate confusion and misinterpretation, this Plan recommends amending the Code to change the term "common open space" to "common areas."

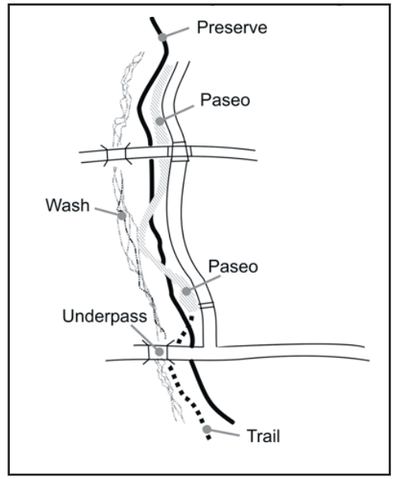
Administrative Approaches/ Programs

Recommendation 1: Support a Non-Profit Open Space Coalition

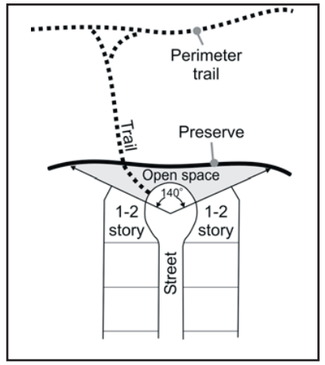
Encourage the establishment of a land trust or non-profit coalition for the purpose of fund-raising, coordinating volunteers, and protecting and providing management for open space properties. The City should investigate the collaborative roles non-profits, land trusts, or federal agencies may provide in managing these sensitive lands, as described under Land Management and Stewardship Strategies.



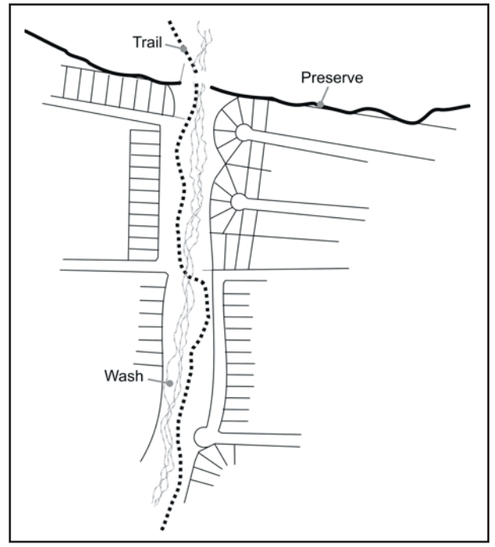
Combinations of public and private streets provides visual and recreational access to protected edges (City of Phoenix)



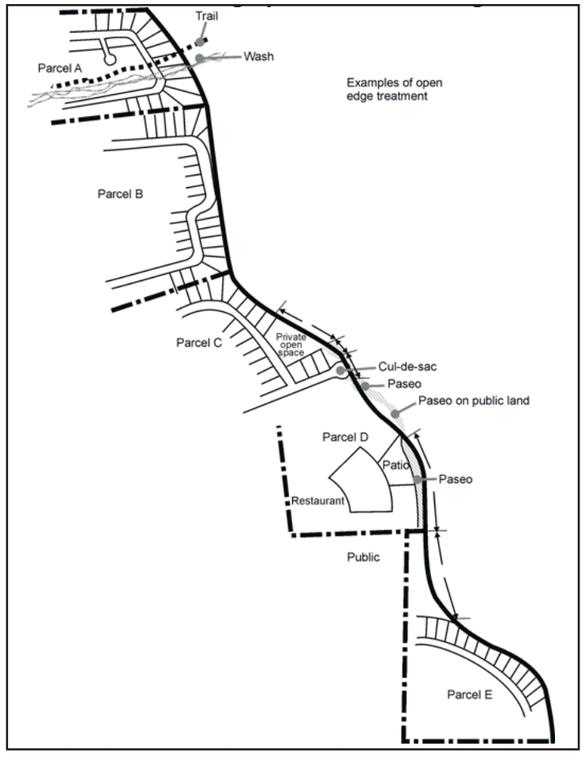
Roadway follows the form of the protected edge (City of Phoenix)



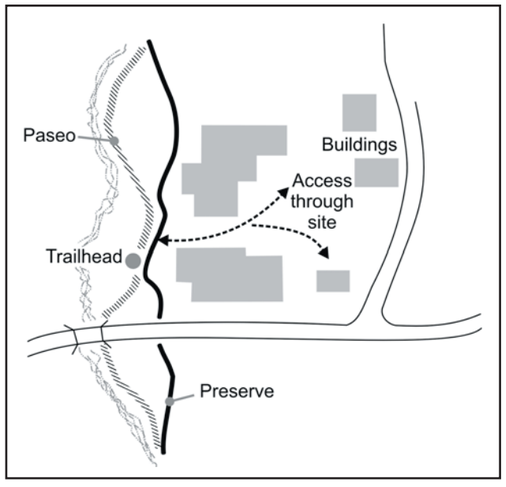
Cul-de-sac option that provides visual and recreational access to the protected edge (City of Phoenix)



Protected wash corridors provide a connection to larger protected properties (City of Phoenix)



A coordinated edge plan between developments combines possible edge treatments on different parcels (City of Phoenix)

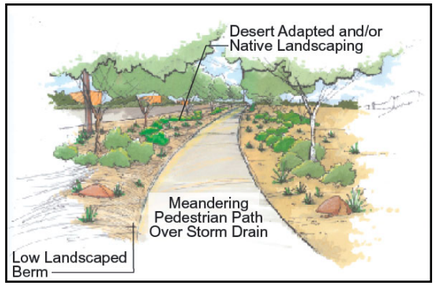


Pedestrian access through commercial site (City of Phoenix)

Whitney Wash near Galleria. Channels are now required to have an access road and in some cases a walkway for emergency services. This channel as depicted would not be permitted in Henderson today.

Pitman Wash and Duck Creek showing pedestrian access (above). Some areas lack access points due to fencing. An expanded right-of-way in other areas would permit other pedestrian amenities in addition the trail itself.

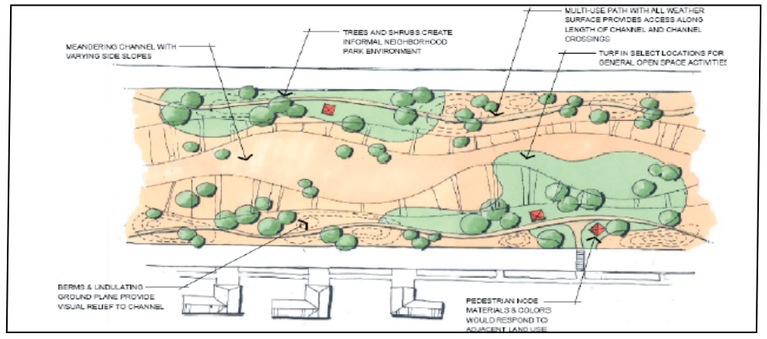
Pittman Wash is an example of a semi-natural wash with pedestrian circulation.



Pedestrian right-of-way w/ landscaping buffered from channel (concrete channel to the left).

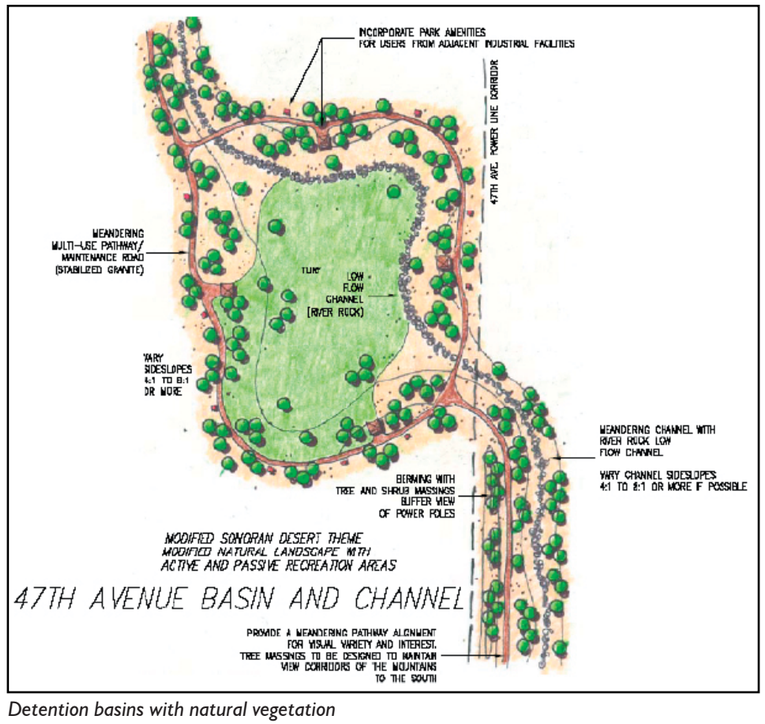
Example of multi-use bridge - pedestrians pass on the right, flood waters pass on the far left.

Engineered channel with native material, dual pedestrian alignments and amenities (kiosks, landscaping, access points from adjacent neighborhoods).


MEANDERING CHANNEL WITH VARYING SIDE SLOPES
TREES AND SHRUBS CREATE INFORMAL NEIGHBORHOOD PARK ENVIRONMENT
MULTI-USE PATH WITH ALL WEATHER SURFACE PROVIDES ACCESS ALONG LENGTH OF CHANNEL AND CHANNEL CROSSINGS
TURF IN SELECT LOCATIONS FOR GENERAL OPEN SPACE ACTIVITIES
BERMS & UNDULATING GROUND PLANE PROVIDE VISUAL RELIEF TO CHANNEL
PEDESTRIAN NODE MATERIALS & COLORS WOULD RESPOND TO ADJACENT LAND USE

Regional Detention Site in East Henderson College Area

McCullough Hills multi-use detention basin (detention basin in blue outline)


INCORPORATE PARK AMENITIES FOR USERS FROM ADJACENT INDUSTRIAL FACILITIES
47TH AVE. POWER LINE CORRIDOR
MEANDERING MULTI-USE PATHWAY/ MAINTENANCE ROAD (STABILIZED GRANITE)
TURF
LOW FLOW CHANNEL (RIVER ROCK)
VARY SIDESLOPES 4:1 TO 8:1 OR MORE
MEANDERING CHANNEL WITH RIVER ROCK LOW FLOW CHANNEL
VARY CHANNEL SIDESLOPES 4:1 TO 8:1 OR MORE IF POSSIBLE
BERMING WITH TREE AND SHRUB MASSINGS BUFFER VIEW OF POWER POLES
MODIFIED SONORAN DESERT THEME
MODIFIED NATURAL LANDSCAPE WITH
ACTIVE AND PASSIVE RECREATION AREAS
47TH AVENUE BASIN AND CHANNEL
PROVIDE A MEANDERING PATHWAY ALIGNMENT FOR VISUAL VARIETY AND INTEREST. TREE MASSINGS TO BE DESIGNED TO MAINTAIN VIEW CORRIDORS OF THE MOUNTAINS TO THE SOUTH

Detention basins with natural vegetation

Recommedation 2: Purchase Lands Only When Necessary

Initially, relatively few acres will be acquired per year because of limited funds and the high cost of land. For a variety of reasons, it is recommended that open space remain privately owned except in those instances where public access is needed for trails or other passive uses as described under Land Management and Stewardship Strategies.

Recommendation 3: Continue to Involve the Open Space Plan Advisory Committee

Continue to involve the Open Space Advisory Committee members throughout the implementation process. Possible roles may include the review of future land nominations for plan conformance, providing input on management plans for open space areas and drainage facility designs for significant natural washes. Involvement could be on an informal basis with meetings as necessary. In addition, a quarterly newsletter could be distributed to the Advisory Committee and others to provide an update on the plan implementation.

II. STORM DRAINAGE STRATEGIES

Supporting Principles and Policies	
Principle 1	**Henderson's Open Space System Serves Multiple Purposes**
Policy 1.1	Variety of Open Space Types
Policy 1.2	Sensitive Lands Protected
Policy 1.3	Recreation Use of Open Space
Policy 1.5	Open Spaces Adequately Sized and Configured for Purpose
Principle 2	**Henderson will have an Interconnected System of Protected Desert Environments**
Policy 2.1	Connected Natural Areas Instead of "Islands"
Policy 2.2	Trail Corridor Connectivity
Principle 3	**Henderson will Consider Multiple Values in the Design of Storm Drainage Improvements**
Policy 3.1	Coordinated Planning
Policy 3.2	Adequate Trail Width
Policy 3.3	Aesthetic and Recreational Benefits of Flood Control Facilities
Policy 3.4	Natural Channel Protection
Policy 3.5	Public Participation in Planning Storm Drainage Improvements

Storm drainage improvements are an essential element of the community. In addition to protecting human safety and property, the improvements constructed to accommodate storm drainage can provide other important benefits. In many desert communities, including fast-growing areas in Southern California and Arizona, storm drainage channels are a vital element of the parks, trails and open space system. In these regions, drainage improvements are routinely designed and constructed as multi-purpose projects that not only achieve flood protection, but also create opportunities for trail development, resource conservation and enhancement of the natural environment. As the price of land continues to increase, it will be imperative to maximize the capital costs of storm drainage improvements by meeting other community objectives.

Natural or natural-appearing washes and arroyos provide the most optimal recreational experience. They often have the lowest maintenance cost compared to other flood control structures. Many other flood control districts nationwide have further found that the cost of protecting natural washes (through building setbacks, acquisition, easements, etc.) is less than the capital installation costs if such washes were channelized. However, high land costs in the Las Vegas Valley and a lack of regional and local regulations and incentives that encourage the protection of natural channels have limited this opportunity in Henderson.

The principles and policies presented in Chapter 3 and the following recommendations and alternative approaches to storm drainage are not intended to imply that a single goal or type of approach is right in all cases or that a "one size fits all" approach is appropriate. Rather, storm drainage recommendations are intended to encourage a consideration of other community values in the design of storm drainage improvements, one that incorporates a multi-purpose approach where possible without compromising other flood control objectives. Changing traditional approaches to storm drainage will require leadership, initiative, persistence, and at times, creative funding strategies.

Planning

Recommendation 1: Build Upon the Mission of the Clark County Regional Flood Control District

As described in Chapter 2, Clark County Regional Flood Control District (CCRFCD) mission centers on protecting "life and property for existing residents, future residents, and visitors from the impacts of flooding." Due to the rapid pace of community growth and historic catastrophic floods, the CCRFCD was created with a focused mandate. Although the CCRFCD has a policy that encourages municipalities to identify and plan for multi-use facilities, the District does not fund joint-use projects, therefore the potential for recreational facilities to be designed and constructed in tandem is limited. As shown by Table 2-3, the missions of other flood control districts in the urbanizing southwest include a more balanced approach and fund projects that serve multiple objectives. In order for funding for natural drainageways or joint-use facilities to be obtained from the CCRFCD, a change to the CCRFCD mission and potential funding allocations would be needed through changes to the Nevada Revised Statutes.

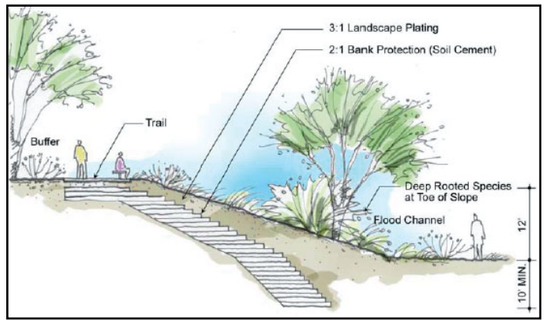
In the absence of CCRFCD funding for joint-use projects, the City should build upon the mission and policies in place, which encourage early planning and coordination with the CCRFCD. Opportunities should be identified early and included in a open space and trails capital plan in concert with the CCRFCD 10-Year Capital Improvement Plan. Through coordination, funds for the most cost effective solution afforded by the CCRFCD could be supplemented with other monies obtained by Henderson to provide joint-use facilities and constructed at the same time, thereby minimizing capital costs.

The City of Henderson should develop a formal policy basis to promote multiple use projects and maintain natural-appearing washes where public benefit is evident. The Southern Nevada Regional Policy Plan also promotes the use of flood control facilities as corridors for trail systems, and other recreational amenities as appropriate, as well as for the safe conveyance and detainment of flood flows.

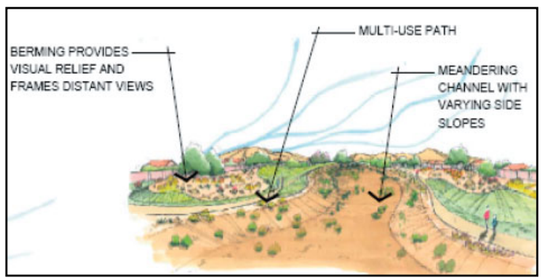
Recommendation 2: Create Safe, Pleasant Pedestrian Environments Adjacent to Storm Drainage Facilities for Future Developments

The purpose of jointly planning for trails and drainage facilities is to make possible the creation of a safe, pleasant pedestrian environment. The width of adequate right-of-ways should vary with the type of channel (e.g. regional drainage channels would typically provide enough room for a multi-purpose trail with a tread width of 12 feet, local channels would be designed with a smaller width and serve neighborhood needs). Fencing and guardrails should be designed to meet the Flood Control District's standards and to minimize liability to the City. Bridges and box culverts should be sized so as not to eliminate the opportunity for a vehicle-pedestrian separated trail crossing in the future. Landscaping for aesthetic purposes, as well as to provide shade, screen trail users from adjacent property owners, and separate

Minor wash in the Cornerstone Lake vicinity



Design Concepts for Agua Fria Channel, EDAW



Loop 303 Corridor/White Tanks Drainage Master Plan

Whitney Mesa Wash before and after it flows in to a concrete channel

Washes in Sloan Canyon and West Henderson

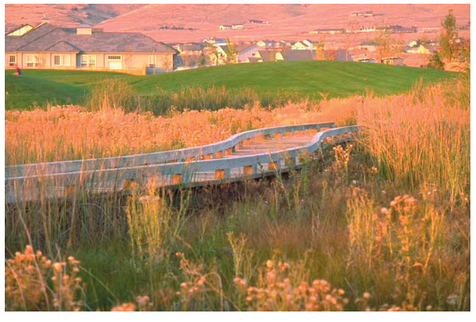
Aerial of Las Vegas Wash floodplain

In some instances, developers have conserved natural washes as a neighborhood amenity.

"The site plan should identify any existing natural washes, drainage tracts, easements, or drainage channels located on the lot, or bordering the lot, that may involve or affect the drainage of the lot to be developed. **The intent of these guidelines is to minimize the impacts to the numerous washes that flow throughout the area."**

Rio Verde Drainage Master Plan

Less intense uses in key floodplains provide scenic and recreational opportunities connecting throughout the community, in addition to the water quality, infiltration, and wildlife benefits as shown in these examples from Sparks, NV.



"The 100-year floodplain of watercourses within the environmentally sensitive lands (ESL) area with a capacity of 50 cubic feet per second (c.f.s.) or greater shall be dedicated to the city by a drainage easement and maintained in their natural state."

The purpose of this policy is to reduce the capital and maintenance costs incurred when natural drainages are channelized following urbanization.

City of Scottsdale

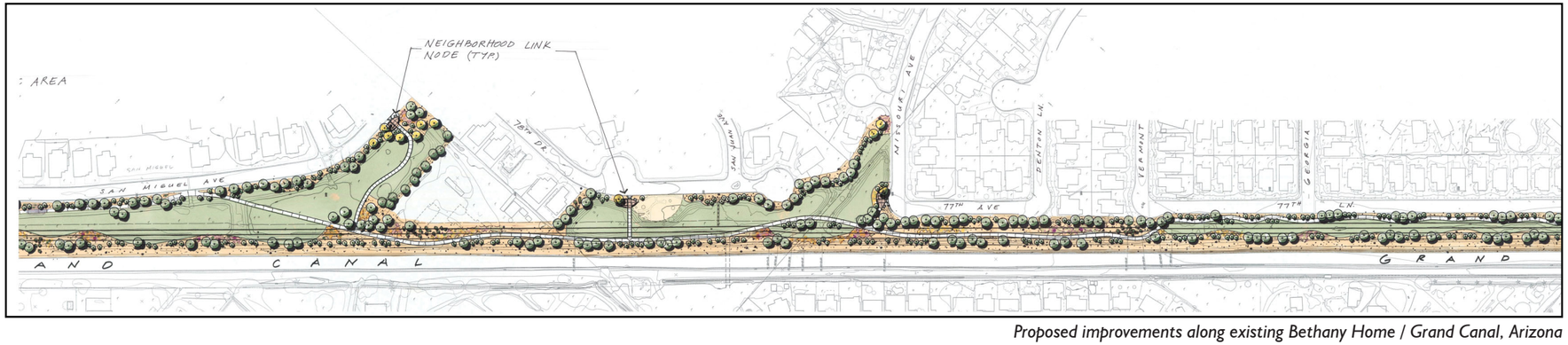
Duck Creek Channel near Pecos

users from concrete channels should be provided (see trail figures in Chapter 3). These standards can be formalized as described below in Storm Drainage Strategies: Regulatory Approaches.

Recommendation 3: Provide Pedestrian Amenities within Existing Areas

Existing channels often offer the potential to provide greater community benefits. A number of existing drainage channels, including portions of Duck Creek and Pitman Wash, have an adequate amount of room to develop a trail and to incorporate other enhancements such as landscaping. Trails and pedestrian amenities, such as a combination of traditional park features and native vegetation, should continue to be developed along existing channels.

Existing and proposed conditions of the Bethany Home/Grand Canal Flood Control Project, a joint project among the cities of Glendale and Phoenix and the Maricopa County Flood Control District



Proposed improvements along existing Bethany Home / Grand Canal, Arizona

Recommendation 4: Protect Significant Natural Washes

In developing areas, floodplains can naturally form the linear spine of an interconnected regional greenway of open space, parks and trails. The City should investigate a watershed approach to flood management in key areas that allow storm flows to naturally disperse over an open area, thereby increasing infiltration and groundwater recharge, improving water quality, maintaining riparian plant communities, and creating recreational and scenic corridors. Consideration should be given to preserving natural floodplain characteristics in upstream areas. For existing urban areas, the City should investigate partnering with other regional agencies in flood-prone land acquisition programs to reduce chronic flooding and to provide for enhanced trail connectivity and infiltration. When regional facilities may be protected, the City should investigate funding strategies to supplement CCRFCD resources. Since CCRFCD is limited in funding the most cost effective solution, the City is responsible for the identification of any additional needed funds.

Regulatory Approaches

Recommendation 1: Investigate Floodplain Development Policies

The City should investigate a range of floodplain development policies for developing areas to minimize the potential losses and hazards to life and property that are created when development in floodplains increases the likelihood of flooding on either the property under development or other properties downstream. Without policies that consider floodplain encroachment, it will be difficult to preserve significant natural channels since increased storm flows from urban encroachment on the floodplain will typically require natural channels to be structurally reinforced.

As stormwater regulatory plans are updated, consideration should be given to reducing stream impacts from peak flows by minimizing impervious surfaces, detaining stormwater runoff on-site prior to discharge into natural washes, and other appropriate strategies.

Recommendation 2: Recommend City Design Standards to the Clark County Regional Flood Control District Hydrologic Criteria and Drainage Design Manual

All regional flood control projects completed within the City of Henderson must meet the Regional Flood Control District's minimum design standards, as contained in the Hydrologic Criteria and Drainage Design Manual. The City can add additional standards to the Manual, which then supersede minimum standards. Multi-use design requirements, natural-appearing channel designs, and pedestrian amenities are some standards that should be investigated.

III. TRAIL SYSTEM STRATEGIES

Supporting Principles and Policies	
Policy 1.3	Recreation Use of Open Space
Principle 2	**Henderson will have an Interconnected System of Protected Desert Environments.**
Policy 2.1	Connected Natural Areas Instead of "Islands"
Policy 2.2	Trail Corridor Connectivity
Policy 2.3	Hierarchy of Trail Types
Principle 3	**Henderson will Consider Multiple Values in the Design of Storm Drainage Improvements.**
Policy 3.1	Coordinated Planning
Policy 3.2	Adequate Trail Width
Policy 3.3	Aesthetic and Recreational Benefits of Flood Control Facilities
Policy 3.5	Public Participation in Planning Storm Drainage Improvements
Policy 4.2	Access to Public Lands at the Desert Edge
Policy 5.4	Public Education about Mohave Desert and Stewardship
Policy 5.5	Safety in Open Spaces

Planning Tools

Recommendation 1. Consider the Needs of Pedestrians in All Development Decisions

A trails system is only one aspect of a functional alternative transportation system (albeit a critical one), and trails will not be fully utilized if the remaining pedestrian system is dysfunctional. First and foremost, walking must be a practical and enjoyable means of travel. This implies not only that pedestrian environments are adequately designed and maintained (with provisions for shade, resting, aesthetic enhancements, etc.), but that destinations are connected and mobility options are available. City, regional, and federal entities must provide a full suite of complimentary travel choices in order for single-occupancy vehicle dependence to decrease. City leadership should ensure that inventories of existing facilities and capital improvement plans are current, that potential funding mechanisms are fully employed, and adequate staff are assigned to create and maintain pleasant pedestrian environments. This may include a review of bicycle, pedestrian, and transit policies and programs to identify additional means necessary to facilitate increased use of these alternative modes of transportation.

Regulatory Tools

Recommendation 1: Ensure Consistency Between Bicycle, Pedestrian, and Trail Facility Plans and Definitions

While this study has focused solely on community needs for trails, a functional trails system is dependent on the entire pedestrian system as described above. The City should review other existing plans, such as the Bicycle Master Plan for consistency in alignments, design criteria, and terminology. This may include clarifying regulatory definitions in the Code for trails, shared use paths, and neighborhood sidewalks, and other pedestrian facilities.

Recommendation 2: Strengthen Trail Corridor Dedication Provisions in the Code

The City's Development Code includes requirements for connectivity and other regulations related to trails. However, requirements are not in a central location in the Code. By strengthening the dedication provisions for trails and landmark corridors and consolidating trail Code requirements, the development review process will be streamlined to increase dedication compliance. Furthermore, to ensure the timely construction of trail facilities, the completion of trails facilities should be completed prior to project Certification of Final Occupancy.

Recommendation 3: Amend Code to Require Internal and External Connectivity within Subdivisions

Walls, cul-de-sacs, and other subdivision designs limit internal and external trail, bicycle, and pedestrian connectivity. Consider amending the Development Code to require connectivity between residential and non-residential developments to reduce vehicle trips per day and the total number of vehicle miles traveled. While walls and fences act as a buffer for noise and limit neighborhood traffic, trail access should be maintained. Code Sec. 19.9.9, Transportation and Circulation, and regulations related to wall and fence design would be amended to require a minimum of paths which link residential subdivisions to adjacent commercial, industrial, or public uses.

An additional modification to the Development Code or Design Standards that could be made to improve connectivity is recommendation of a modified cul-de-sac neighborhood design as an alternative to the traditional cul-de-sac. This design would require pedestrian connections from residences to adjacent roadways and developments, thereby decreasing the distance of pedestrian travel.

Prioritization Tools

Due to sustained, rapid growth in Henderson, implementing a successful trail system will require that planning efforts stay ahead of development as much as possible. Retrofitting existing infrastructure is more costly and difficult in comparison to integrating trail requirements into initial land use and transportation plans. The greatest opportunity for quickly advancing a safe, connected trail system is in future growth areas.

As a general rule, most trail improvements in existing urban areas will continue to be opportunistic. That is, that trails will be created and connected as bridges, underpasses, rights-of-way expansions, and other infrastructure projects arise. As a result, urbanized areas typically will be a lower priority unless life and safety issues are a concern.

This section outlines a twofold approach for prioritizing system development in existing urban areas and future growth areas.

Existing Urbanized Area Recommendations

Priority 1: Current Liabilities

There are some instances where existing trails are located in or provide access to potentially hazardous areas. Examples of safety issues include areas where existing trails meet or cross arterial streets without signals or designated crossings, and areas where trails parallel are immediately adjacent to an abrupt drop-off exceeding thirty inches where no guardrails are installed (i.e., flood control facilities). Safety concerns may create liability issues for the City if not resolved quickly.

Liabilities should be addressed on a site-specific basis as soon as they are identified. Affected City departments should reach a consensus on the resolution of each issue, and ensure that future design and construction will not create further risks to public safety.

Priority 2: Current Development Projects

Locations where commercial developments, bridges, intersections, or flood control channels are currently under design may significantly impact the connectivity and user experience of the overall trails system if trail facilities are not adequately addressed. Current projects also allow the City to maximize connectivity opportunities or repair noncompliant trail facilities at a lower cost.

All current projects should be reviewed against the Trails Framework Plan, trail design standards, and trails classifications to identify potential impacts to recommended alignments. Once areas of conflict are identified, appropriate City staff from all departments involved should work together to develop an acceptable solution.

Priority 3: Critical Connectivity Gaps

For most trail segments in urbanized areas, trails staff will need to act single-handedly in closing critical gaps in the trail system. The process for acquiring rights-of-way, trail easements, or property for "retrofit" alignments will be highly variable. Each site will need to be addressed on a case-by-case basis and may require coordination with multiple property owners and agency jurisdictions, established neighborhood associations and businesses, and incompatible infrastructure. For example, the 2½ mile Pittman Wash Landmark Corridor dead-ends at Arroyo Grande Park and Santiago Drive. Existing arterials and flood control channels create significant obstacles in continuing an off-street trail north to Whitney Mesa or Wetlands Park.

In urbanized areas, developing Landmark Corridors should be the first priority as they provide key connectivity and the best user experience. Primary Trails and Secondary Trails should follow in importance. Secondary Trails already occur in many areas per the Code. Trail segments of the same type should be prioritized according to user demand, current levels of service, amount of users served, connectivity to the existing trail system, and potential connections to key community amenities such as parks and recreation centers.

Future Growth Areas Recommendations

Priority 1: Future Growth Areas

Future growth areas, recently annexed areas, and other areas in the initial land use planning phases present the greatest trail opportunities. With a proactive approach, trail principles and policies for these areas – including most Open Space Opportunity Areas identified on the Framework Map (Black Mountain, Southwest Henderson, River Mountains, etc.) – can still be achieved.

Trail corridors should be fully integrated into private and public land use processes away from road corridors. Conceptual corridors in some future growth areas are identified on Framework Map, but may be deviated from to accommodate future roads and uses. Further study, including GPS "staking" of each alignment, should occur during initial land use planning for each growth area to take into account existing and planned natural features and amenities. Landmark Corridor planning should occur in tandem with flood control and traffic master planning in order to identify right-of-way, bridge, or underpass requirements early in the process. Integrating trail corridors early in the process will require close coordination and supervision between City departments.

Once land use plans have addressed trail requirements, City trails compliance staff should review transportation, flood control and infrastructure master plans during the preliminary design and entitlement process. Gated community master plans should provide access around or through their developments in addition to providing internal circulation. Site plan submittals should demonstrate compliance with the Framework Plan, and should be reviewed by trails staff to ensure that proper trail corridors are preserved and that the corridors will provide first class user experiences. Successful completion of this goal will require substantial coordination between City departments and other government agencies.

Trails in Seven Hills, Henderson

IV. LAND MANAGEMENT AND STEWARDSHIP STRATEGIES

Supporting Principles and Policies	
Principle 5	**Our Community will Provide Long-Term Stewardship of our Open Space System.**
Policy 5.1	Natural-appearing Desert Condition of Open Spaces
Policy 5.3	Variety of Open Space Stewardship Approaches
Policy 5.4	Public Education about Mohave Desert and Stewardship
Policy 5.5	Safety in Open Spaces

Land management refers to the day-to-day field tasks and programs that ensure that natural resources, facilities, and user experiences achieve plan goals. A well-managed open space and trails system promotes positive user experiences, protects wildlife requirements, and limits liability.

These responsibilities will occur in two phases. Initially, the City's open space responsibilities will emphasize public awareness, intergovernmental coordination, property negotiation/acquisition, and amending codes and existing plans that impede conservation efforts. As the City acquires additional land and encourages public use of natural areas, it will incur additional responsibilities, such as funding needs for capital improvements, maintenance, environmental stewardship, and public safety.

The maintenance and improvement of the City's open space and trails system is essential in ensuring the safety of users and the value of the system as a whole. Development of new open space areas may require that the Parks and Recreation Department's traditional role in parks maintenance be expanded to encompass land management where passive recreation is desired. Fortunately, open space maintenance is substantially less than costs associated with the maintenance of active parks; the cost of maintaining parks is up to 4 times more expensive than maintaining open space. Furthermore, natural areas that remain in private ownership (through zoning, conservation easements, HOA agreements, etc.) or that are managed by other public land agencies do not require City maintenance. For this and other reasons, the Open Space and Trails Plan recommends that open spaces remain privately owned or not be disposed of, except in situations where opportunities for public access are desired.

Open Space Maintenance Implications

Maintenance level costs for open space require significantly less manpower and equipment, and may be able to rely more on volunteer restoration and clean-up activities than traditional parks maintenance. Experience indicates that on average open space costs less than $100 per acre for natural areas with no facilities, and up to $400 per acre for more developed sites. For example, analyses of comparative open space and trail maintenance costs revealed that:

- The Stratton Meadows Open Space in the City of Colorado Springs costs $95 per acre/year (Rick Severson, phone communication)
- Larimer County, Colorado determined an average of $95 per acre/year among publicly-funded open space programs (Larimer County FY 2000 Study)
- Jefferson County, Colorado averages $89.45 per acre/year (Stanton La Breche, email communication)
- The Environmental Protection Agency's 1999 Report, *Landscaping with Native Plants*, demonstrates that the cost to maintain a monoculture turf is roughly $1,000/per acre/year, whereas the cost to maintain a meadow is approximately $150/acre/year

In contrast, City of Henderson parks maintenance requires an average of approximately $15,400 per acre/year (City of Henderson Office of Budget and Strategic Management, Budget in Summary: Fiscal Year 2004-2005), with a standard of 1 maintenance employee per 10 acres of developed park (City of Henderson Parks & Recreation Department, Five year Plan, 2000-2005).

Since many current funding programs, such as SNPLMA, require that the City maintains any facility designed or constructed utilizing grant monies, a burden is placed on the City's budget to fund the maintenance of additional facilities. The City should establish procedures for allocating maintenance funds or additional personnel to the appropriate department (Parks or Public Works) upon receipt of grant monies to ensure that these additional facilities are properly maintained.

Maintenance of natural open space lands is typically limited to periodic clean-up, restoration, vegetation management, storm channel maintenance, and access management. Of these, proper flood control and access management (i.e., people management) is critical to reducing maintenance requirements. Flood control monitoring and maintenance conducted by the Public Works Department, including bank stabilization, culvert cleaning, and vegetation restoration is required to ensure that flooding does not exceed natural disturbance patterns or pose a threat to built facilities or safety. Potential damage caused to open space resources by vandalism, illegal dumping, off-road vehicles, and cross-country hiking and mountain biking can be minimized through access management tools such as appropriate fencing, posted regulations, enforcement, and volunteer stewardship programs.

Trail Maintenance Implications

Routine trail maintenance varies with the surface type and may include sweeping the trail clean of debris, minor repairs to trail fixtures and features, and limited vegetation management of xeric and native plantings. The path or trail should be inspected on a regular basis to assess the overall condition of the drainage, pavement, signage, pavement markings and vegetation growth. Drainage areas should be improved or repaired as problems are noted. Vegetation should be removed from the pavement and surrounding areas where it can affect use of the path. Signage should be repaired, replaced or upgraded. Properly constructed concrete, asphalt or soft surface trails require minimal maintenance. Proper planning and design, however, is a key to the reduction of maintenance costs.

Soft Surface Trail Maintenance

Special training of City staff or volunteers is recommended for maintenance of soft surface trails. The International Mountain Biking Association, for example, and other non-profit groups are valuable resources for providing training and evaluating trails which require maintenance. Evaluation of site specific soil and slope conditions are critical to determining required stabilization and dust mitigation materials. There are multiple options available to mitigate or minimize dust and erosion, including soil hardeners, recycled asphalt and compacted fines. It is recommended that the City construct test sections of trail for proposed materials and evaluate existing BLM and County facilities to determine what combinations of materials work best for each environmental condition.

Trail Corridor Maintenance

Landscaping within City owned trail corridors, easements or Rights-of-Way should be irrigated and maintained by City staff. Native plant communities should be protected from disturbance during construction in order to minimize re-landscaping, irrigation, and soil stabilization costs. In order for naturalized desert, wetland or riparian corridors to be maintained in a more natural rather than manicured state, additional staff expertise may be required in wetlands, plant ecology or weed management.

Trail Maintenance Costs

Trail maintenance costs vary, depending upon numerous factors such as location, level of use, surface type, level of involvement from volunteers, and many others. For planning purposes, a reasonable cost estimate is $2,000 per mile per year. A recent study (Rail-Trail Maintenance & Operation, July 2005) published by the Rails to Trails Conservancy, provides some good cost information. This study found through a survey of approximately 39 trail providers that the average cost of maintaining a trail among those surveyed was $1,500 per mile per year. For trail systems run by some type of governmental organization, which typically rely less on volunteer efforts than non-profit or volunteer organizations, this cost increased to $2,000 per mile per year.

Irrigation

Irrigation systems will be required to establish and maintain landscapes throughout the trail corridor. The length of these corridors and lack of utility access can often make permanent irrigation systems a costly expense in some areas. Careful selection of native plants and efficient irrigation systems will help reduce water costs, plant loss and maintenance of landscape areas.

Management Tools

Recommendation 1: Dedicate Staff Resources Needed for Plan Implementation

Stewardship means responsibility for resources. City departments and staff assigned to the open space and trails program will be responsible for important natural, fiscal, and human resources. To complete their tasks effectively, staff must be both knowledgeable and dedicated, with sufficient authority and resources to act and be accountable for project results. With that in mind, many staff have expressed concern about the additional responsibilities associated with plan implementation since existing budgets and staff responsibilities are already overstretched.

Given the diverse nature of sensitive lands and the development process, successful open space projects will require coordination, cooperation, and communication between the departments of Community Development, Parks and Recreation, Fire, Public Works, Utilities, Property Management, and Police. While the range of departments involved in open space and trails planning provides a wealth of expertise, coordination among departments will create new challenges. It is particularly difficult to provide effective development plan review, funding application processing, project prioritization, and monitoring as no one individual has the specific knowledge, direct authority, or responsibility to enforce open space, trails, bicycle, or pedestrian decisions.

A significant opportunity exists to streamline the open space and trail planning processes and allow for more effective coordination of efforts by delineating departmental responsibilities and assigning sufficient staff. While the existing system involving representatives from several departments works effectively in most instances, the designation of additional staff has the potential to substantially improve the efficiency and effectiveness of plan implementation.

Additional roles, especially land management tasks, will eventually need additional staff resources to fulfill various open space functions. In the immediate term however, remaining open space and trails responsibilities can be filled by existing City staff who “wear several hats.”

Essential functions include:

- Acts as a point person in identifying and protecting high resource value lands;
- Oversees negotiations with property owners and the BLM
- Represents open space interests in current and advanced planning, including transportation and flood control improvements, development reviews, and annexation agreements
- Provides expertise and official representation in planning and entitling trail corridors and in other plan review processes, including managing the interests of each department in trails, bicycle and pedestrian facility planning efforts
- Supervises the design, construction, and maintenance of trail corridors, and participates in the capital improvement process to ensure connectivity and multi-use goals are achieved in traffic and flood control projects
- Serves as a centralized source of information on the trail facility and open space property inventories
- Assures that the Open Space Map, Trails Map, and Master Bicycle and Pedestrian Facilities Map are current, and that master plans are updated every 5 years
- Leads intergovernmental coordination efforts to protect adjacent natural resources and promote recreational access
- Coordinates land acquisitions with other City departments
- Represents open space concerns at Parks and Recreation Board, Planning Commission, and City Council meetings
- Acquires funding and fosters partnerships for open space protection, trail construction, and maintenance
- Monitors plan implementation

Recommendation 2: Develop Management Plans for Open Space Properties

Develop Management Plans for significant Resource Areas, Preserves (i.e. the proposed Black Mountain Nature Preserve), or open space properties of similar land types (hillsides, washes, etc.). These concise, sensible, and realistic management plans should follow the same process used in preparing individual park master plans, and give additional direction regarding the following:

- administrative responsibilities,
- required capital improvements,
- vegetation, weed, and pest management approaches,
- ecosystem and/or single species management that focuses on improving the viability and diversity of species,
- special lands management that addresses natural washes or natural communities of significant value,
- maintenance level of service costs,
- volunteer opportunities,
- appropriate recreational or educational uses and their locations
- mitigation of conflicts between different user groups
- mitigation of threats to open space resources,
- mitigation of potential liabilities,
- monitoring efforts; and
- an estimate of long-term stewardship costs.

Management plans should be reviewed annually and updated every 5 years with tasks, operational policies, and land management goals.

Recommendation 3: Coordinate and Form Partnerships to Implement this Plan and to Manage Open Space Properties

The City should continue to work with other agencies, including Clark County, the Bureau of Land Management (BLM), the Bureau of Reclamation, National Park Service, Clark County Flood Control District, Regional Transportation Commission, other agencies, and local developers to implement the principles of this plan. The Union Pacific Rail Road Trail is an example of an existing partnersip between the City of Henderson, Clark County, and the Regional Transportation Commission.

The City must be proactive in ensuring that maintenance agreements are established in order to ensure the safety and integrity of open spaces and trails in master planned communities. Property Associations should accept perpetual responsibility for the preservation and maintenance of natural washes, neighborhood trails, and open spaces within their subdivision before or concurrently with the approval of the final development plan.

Recommendation 4: Develop a Volunteer Steward Program

As open spaces become available for public use, continue to utilize and expand volunteer efforts to accomplish land management goals. Volunteer projects might include trail building and maintenance, office assistance, plant and wildlife inventories, trash removal, etc. Adopt-a-Natural Area, a Ranger Program, or a Naturalist Outreach program can provide opportunities for citizens to take an active part in the stewardship of local natural areas. Volunteer naturalists can be trained by the Parks Department to explain the values and benefits of natural areas in the urban environment to local groups and take groups on guided tours.

Recommendation 5: Develop a Safety / Risk Management Program

Public safety in natural areas and on trails is a priority for the City. The City should use a four-fold approach to minimizing threats to public safety and damage to protected resources.

1. ***Planning and Design***: Risk management reviews should be conducted for each large open space property acquired by the City during the land management planning process. Police and fire should participate in the design review for all proposed improvements, and Crime Prevention Through Environmental Design (CPTED) practices should be utilized in planning and designing passive use areas to deter criminal activities. The City should continue to implement an emergency response protocol for accessing and responding to accidents in isolated areas, such as Black Mountain and Sloan Canyon NCA, with the Police and Fire Departments and BLM and County EMS agencies.
2. ***Education and Partnerships***: Rules and regulations should be adequately posted on sites and in program literature. Adjacent neighborhoods and property owners should be encouraged to take responsibility for their use of open spaces through Adopt-a-Natural Area Programs and other joint projects.

   The City of Henderson should maintain a close relationship with other agencies and non-profit groups such as the Nevada Department of Motor Vehicles Office of Traffic Safety, Clark County School District, SAFE KIDS, and the Boys and Girls Club, in order to foster partnerships in the promoting trail safety and awareness. The City of Henderson also should work with Clark County and the Southern Nevada Regional Trails Partnership (SNRTP) in their education and awareness programs. For example, their National Trails Day activities represent an important opportunity for the City of Henderson to promote safety guidelines.
3. ***Monitoring***: Trails and facilities should be routinely inspected for safety hazards, liabilities, and vandalism.
4. ***Enforcement***: Enforcement of existing laws ensures that all users will feel comfortable using the bicycle and pedestrian facilities and will enjoy a pleasant experience. The City of Henderson Police Department has responsibility for ensuring that trail and open space users comply with both traffic and behavior-related laws. Patrolling the City's extensive bicycle and pedestrian system, particularly on those facilities which are more isolated (e.g. River Mountains Loop Trail), may require an increased need for enforcement. The City's Police Department does not currently have the staff necessary to provide for full-time patrols of the facilities. Patrols of trails and open spaces occur intermittently, with specific actions resulting only from complaints or emergency calls.

As a result of the successful 2005 law enforcement sales tax measure, it is anticipated that additional funding, personnel, and equipment will increase the attentive presence of uniformed officers on trails to prevent criminal acts. In addition to their assistance, Parks staff can also be highly effective in encouraging compliance with posted regulations. Many municipalities have seen significant decreases in littering, OHV use, off-leash dogs, and other minor acts of vandalism through joint staff and volunteer monitoring and reporting. In most municipalities with developed programs, Parks and Police jointly coordinate a Ranger Program (supplemented by trained volunteers) to monitor vandalism, user behavior, off-leash dogs, and issues citations or calls for emergency personnel as needed.

V. FINANCING STRATEGIES

While identifying potential projects is a critical step in developing an open space and trails system, funding is required to make this plan become a reality. Through the identification of internal and external funding sources, tracking of key application deadlines, City leadership in regional initiatives, community partnerships, and completing necessary documentation (including monitoring), the Plan can become a reality.

The City of Henderson has been successful in securing funds from a variety of federal and local sources for open space and trail projects such as the River Mountain Loop Trail, the Pittman Wash Trail, and the Whitney Mesa Nature Preserve. While past project funding has focused primarily on the development and construction of new trail facilities, funds are also available for open space acquisition, educational programs, trails and parking facilities, and safety programs.

Most open space in Henderson will be protected through regulatory (i.e., dedications, zoning) and long-range planning means (i.e., proactively identifying and protecting resource areas prior to future auctions), with only administrative costs being incurred by the City. As a result, some of the recommendations below are also cited in the Open Space Protection Strategies section (i.e., regulatory strategies, conservation easements, gifts or donations). For acquisition, construction, and a land stewardship program, a combination of strategies and sources is the best financing approach.

Planning Tools

Recommendation 1: Incorporate the Open Space and Trails Plan and Supporting Bicycle and Pedestrian Facility Plans into Regional Plans

Many federal grants require that the proposed bicycle and pedestrian facilities are part of the Metropolitan Planning Organization (MPO) overall transportation plan to be considered for funding. Updates to the City of Henderson Open Space and Trails Plan and Master Bicycle and Pedestrian Facilities Plan must be incorporated in planning documents by the Regional Transportation Commission (RTC) and the Regional Trails Plan, which is an effort by the Southern Nevada Regional Planning Coalition (SNRPC) to ensure connectivity within a Valley-wide system.

In addition, trail and pedestrian facilities collacated through coordination with the Regional Flood Control Master Plan should be built in conjunction with new flood channels and facilities as feasible. By including Henderson's bicycle and pedestrian facilities at flood control channels and utilizing funds through the Regional Flood Control District, these facilities can be constructed concurrently and can prove to be more economical. The dual use of Regional Flood Control District maintenance roads for trails is an opportunity to develop trails for lesser costs. However, local and outside funding sources should be identified to supplement CCRFCD funding when additional right-of-way or alternate designs for landscaping or other treatments are required.

Recommendation 2: Continue to Participate in the Neighborhood Services' Grants Clearinghouse

The City's Neighborhood Services Department acts as a clearinghouse for all grant funds obtained. The expertise of the Grants Clearinghouse staff should be utilized to assist in the identification of future grant opportunities for open space and trails projects. In addition, all grants applied for and received should be processed through the Grants Clearinghouse to assist in the coordination between involved Finance, Parks, and other involved departments.

Recommendation 3: Continue to Track Deadline Dates

Application deadline dates should be carefully tracked to ensure the timely submission of all necessary information to the grant source. Coordination between Parks and Recreation, Public Works, and the Community Development Departments to complete these applications is critical. Dates for application availability and deadlines are shown in Table 4-2.

Program	Date of Application Availability	Application Deadline Date
Recreational Trails	December	January/February
SNPLMA	Fall	January
TEA-21	December	January/February
RTCA	April	July
CDBG	November	December

Table 4-2: Ensure Grants are Submitted

Recommendation 4: Foster and Document Community Support

For many grants, the demonstration of community support is one of the criteria that are weighed in the application process. When an open space or trails project is proposed, holding neighborhood meetings is an effective method of documenting support for the project to the funding agency. At such meetings, program changes to meet the needs of the residents can be made in advance. Additionally, continued involvement with user groups such as the Southern Nevada Regional Trails Partnership (SNRTP) and River Mountains Loop Trail Partnership (RMLTP) provides an opportunity to gather community input and support.

Recommendation 5: Identify Future Eligible Projects and Funding Criteria

Based on the deadline dates, level of community support, and estimated project costs, a listing of eligible open space and trails projects and available grants should be maintained. This listing will help to facilitate an efficient application process and will minimize the resources expended by staff in seeking grants.

Funding Tools

The following funding sources are organized by potential revenue sources, grants and outside sources, districts, partnerships and regional activities, and other opportunities and summarized at the conclusion of this section in Table 4-4.

Potential Revenue Sources

Voter-Approved Sales Tax

Given public support for open space and trails (as demonstrated by past surveys), a sales tax proposition may be a future option but is unlikely in the immediate term given the results of past elections. A recent police sales tax (1/2 cent per $1) narrowly received all three approvals to hire more uniformed officers, a first in recent history. As a result, a sales tax increase is seen by some as a highly unlikely option, as Southern Nevada communities historically have not supported additional taxes. However, the City should work with the County to survey voters to gauge willingness to pay such a tax, and then design a sales tax ballot initiative if voters are supportive.

Sales taxes are one of the most commonly used strategies for funding open space programs in many parts of the nation. A dedicated sales tax on the sales of goods or services in Clark County could pay for protection, acquisition, and maintenance of open space, trails and parks. An amendment to the state statute would be necessary, however, since NRS 376A is limited to counties with a population of less than 400,000.

Park and Recreation Tax-Neutral Property Bond Reallocation (Current and Future)

In 1997, Henderson voters approved a 30-year tax-neutral property bond for parks and recreation improvements and maintenance. In combination with SNPLMA funds, revenues from this bond are primarily focused on increasing services to built areas. Past bonds have provided for additional Parks Department staff as new recreation centers and parks

come online. As open space and trails falls within the Parks and Recreation Dept. mission, bond revenues may provide a future source for administrative and land management costs.

User Fees

Fees cover the cost of providing improvements and maintenance on properties where recreation uses take place, for example at a trailhead parking lot. These fees are an annual or per-use cost to the user of the facility. This type of funding mechanism could be used in certain instances, but the opportunities for revenues from this source are limited.

General Fund Allocation

The General Fund, which is one source to fund parks, recreation, and property maintenance activities, is the most likely source of on-going operations and maintenance for open space and trails. The General Fund would also be a possible source for other capital costs. It is recommended that General Fund allocations be increased to fund the additional operations and maintenance activities associated with implementation of this Open Space and Trails Fund. These costs are not expected to be significant, especially in the immediate term as discussed in Land Management and Stewardship Strategies. The City should explore streamlining responsibilities between departments to increase efficiency, and collaborating to increase annual budget contributions to fund open space and trails maintenance.

Continued Creation of Local Improvement Districts (LID's)

Anthem and Green Valley Ranch created 10-20 year LID's to fund park and trail improvements, paid to the City by property owners. The City could require or encourage the additional creation of LID's to fund internal improvements to existing and future master planned community open spaces and trails (turnkey and developer-provided parks and open spaces).

Impact Fees

A number of jurisdictions impose an impact fee on new development as a means of financing needed public improvements, including open space. In effect, development in Henderson is subject to an impact fee associated with implementation of the Clark County Multi-Species Habitat Conservation Plan. This plan requires developers in Clark County to pay a fee of $550 for each acre of raw land developed. At an average density of 4 or 5 units per acre, this is a relatively modest fee per household. It should be noted that despite the revenue generated from the mitigation fee, no projects have been funded by the MSHCP in the City of Henderson, as most funds are directed beyond the disposal area boundary.

Although not in wide-spread use, several jurisdictions impose an impact fee specifically to meet community open space needs. For example, the Town of Berthoud, a rapidly-growing community in northern Colorado, imposes a $3,000 per home fee through a density transfer program. This fee is in addition to fees collected for parks and recreation facilities. More commonly, open space needs are addressed through a combined fee structure that includes developed parkland as well as trails and open space. The City of Albuquerque, New Mexico recently adopted an impact fee that addresses all three elements through a combined program.

Voter-Approved Funding Sources

As previously noted, dedicated sales or property tax measures are a commonly-used strategy for financing open space and trails projects. In most cases, these financing measures are designed to provide funding not only for land acquisition and facility development but operations and maintenance as well. The reasons for this are obvious, but a compelling consideration is the fact that voters are generally less supportive of a tax initiative that only funds maintenance. A combined funding package is more likely to generate voter interest and support. Nevertheless, some communities have been successful at obtaining voter approval of stand-alone funding programs for parks and other maintenance activities. Voters in Berkeley, California, for example, passed a measure that imposes a special tax on all improvements to real property. This measure generates approximately $7 million per year for the maintenance of parks, medians, open space and city trees. A similar measure could be presented to voters in Henderson.

Project	Amount	Funding Round
River Mountains Loop Trail	$1,500,000	2
Union Pacific Railroad Trail – Phase 1	$1,350,000	3
Union Pacific Railroad Trail - Phase 2	$1,300,000	3
Wetlands Trail Connection	$300,000	3
St. Rose Parkway Trail and Landscaping – Phase 1	$791,515	3
Boulder Highway Trail	$500,000	3
Whitney Mesa Nature Preserve	$1,673,250	4
Amargosa Trail	$2,356,230	4
Anthem East Trails	$1,328,250	4
Burkholder Trail	$1,606,710	4
Pittman Wash Trail	$1,106,700	4
Cactus Wren Trail	$577,500	4
Cornerstone Lake Community Park	$12,080,640	5
Mission View Park	$3,935,000	5
River Mountains Loop Trail 13-14 Equestrian Trail Head Improvements	$5,189,184	5
Amargosa Trailheads	$5,662,800	5
Hidden Falls Park	$7,777,440	5
St. Rose Parkway, Phase 2	$8,305,440	5
Union Pacific Railroad Trail (ROW Acquisition)	$9,000,000	5
Union Pacific Railroad Trail, Phase 3	$27,500,000	5
Bird View Preserve	$1,600,000	5
Wetlands Parks - Pabco Trailhead & Picnic Area (Clark Co)	$2,112,000	5
Heritage Recreation Area	$7,392,000	5
Total	**$104,944,659**	

Table 4-3. SNPLMA Parks, Trails, and Natural Areas Grant Monies Awarded since 1999

Revenue From Increased Property Values

Studies in a wide range of urban areas have shown that properties located adjacent to open space and trails can stabalize or increase adjacent and nearby property values. Homes located near greenways or adjacent to open space sell for higher prices than those located farther away. Consider evaluating the increased taxes received from properties located adjacent to open space and directing a portion of these revenues towards the implementation of the open space program and the ongoing maintenance of open space.

Other Measures

Both lodging taxes and real estate transfer fees are used to fund open space acquisition and related purposes in some communities. For example, the Town of Silverthorne, a resort community located in the mountains west of Denver, Colorado, imposes a 2% lodging tax that is used for parks, trails and open space. Lodging tax receipts can be used for open space acquisition in a number of states; for example it is specifically listed as an authorized purpose in the enabling legislation for a lodging tax in the State of Washington. In Nevada, use of this funding mechanism for open space and trails would appear to require new legislation.

A number of communities have adopted a real estate transfer fee to help finance open space acquisition. These programs, which impose a fee on real estate transactions, are often controversial – the Colorado legislature passed legislation making it illegal after several communities adopted real estate transfer fees. However, this funding mechanism is used in a number of states, including New Jersey and California.

Grants and Outside Sources

Southern Nevada Public Lands Management Act (SNPLMA)

In the recent past, the Bureau of Land Management SNPLMA Parks, Trails, and Natural Areas Fund has been an exceptional source of revenue for purchasing land and paying for capital improvements. As shown in Table 4-3, the City of Henderson has been highly successful in repeated successful open space and trails applications with over $100 million in project receipts since 1999. Increased competition for funds from other entities combined with ongoing legislative efforts to redirect revenues away from the Valley may reduce this funding in the future. Although it is possible that current funding amounts will continue, the City should diversify its natural area and trails funding portfolio by pursuing other strategies presented here.

Exploring possible methods to expand the legislation to pay for operations and maintenance ("capital asset preservation") could also be promoted.

Leverage Local Funds by Pursuing State and Federal Grants

The most notable grant sources that could continue to be utilized for open space preservation and trails development are listed below:

Question 1

In November of 2002, Nevada voters passed Question 1, which authorized the State of Nevada to issue general obligation bonds in an amount not to exceed $200 million. Purposes cited in the initiative include:

> "…to preserve water quality; protect open space, lakes, rivers, wetlands, and wildlife habitat; and restore and improve parks, recreational areas, and historic and cultural resources."

Of the total $200 million in funding, $65.5 million is directed to the Nevada Division of State Lands to provide grants for state agencies, local governments, or qualifying private nonprofit organizations for various programs including recreational trails, urban parks, habitat conservation, open spaces, and general natural resource protection projects. The remaining funds were allocated to specific agencies and programs, such as the Nevada Department of State Parks and Nevada Department of Wildlife.

Approximately $290,000 was awarded to the City of Henderson in Round 1 for Project Green (Pittman Wash). Question 1 funds must be allocated to projects by November 5, 2008. Matching contributions of between 5 percent and 50 are required, depending upon project type. Given the limited time remaining in the Question 1 funding cycle, it will be important to identify projects well-suited for this program in the near future.

Question 10

In 2002, Clark County voters passed another in a series of Question 10 initiatives -The Fair Share Funding Program. Subsequently in 2003, the Nevada State Legislature approved Senate Bill 237, which allows the Board of Clark County Commissioners to implement additional revenue sources for transportation improvements. One of the new revenue sources is a sales tax of one quarter of 1 percent to fund additional transportation improvements in Clark County. In addition to multimodal transportation improvements and highway projects, the program can be used to funding additional bicycle trails and related facilities.

Nevada Recreational Trails Fund

This program, which is administered by Nevada State Parks, has limited funding but can be used to supplement other available funding sources for trail development. In 2004, grants of approximately $661,000 were awarded through the program. Eligible projects include maintenance and restoration of existing trails; development and rehabilitation of trailside and trail head facilities and trail linkages; purchase and lease of recreational trail construction and maintenance equipment; construction of new recreational trails, acquisition of easements and fee simple title to property; and operation of educational programs to promote safety and environmental protection. A minimum match amount of 20% is required.

In 2005, Congress passed the Transportation Equity Act: A Legacy for Users, legislation that reauthorizes the Federal-aid surface transportation program through FY 2009. Major funding for a wide variety of transportation projects, including recreational trails and bicycle facilities, is authorized by the legislation and may lead to increased funding for programs such as the recreational trails fund.

Strategy / Fund	How Can it be Used? Acquire Land	Capital Impr.	Land Steward.	Term
Potential Revenue Sources				
Voter-Approved Sales Tax	X	X	X	**Long**
Park tax-neutral property bond (current & future)		X	X	**Immediate**
User Fees			X	**Short**
General Fund Reallocations	X	X	X	**Immediate**
Local Improvement Districts	X	X	X	**Short**
Grants and Outside Sources				
SNPLMA	X	X		**Immediate**
State and Federal Grants	X	X		**Immediate**
Partnerships and Regional Activities				
Joint Use Projects and Partnerships	X	X	X	**Immediate**
Regional Initiatives	X	X	X	**Long**
Clark County Programs	X	X	X	
Other Strategies				
Establish Foundation		X	X	**Short**
Land Trusts	X	X	X	**Short**
In-kind and Volunteer Services		X	X	**Short**
Department of Corrections labor		X	X	**Short**
Open Space Management Endowment			X	**Short**

Table 4-4. Open Space and Trails Financing Options. The Term column describes strategy feasibility in the immediate term (0-1 year), short-term (1-5 years), and long-term (5+ years)

Partnerships and Regional Activities

Joint Use Projects and Partnerships

Joint use projects have the opportunity to achieve adopted goals and other policies at a reduced cost for the City and its partners. In addition to capital cost sharing, the City should explore joint-use agreements or joint funding for operations and maintenance. For example, potential projects could include (1) developing East Equestrian Park and Trailhead in southeast Henderson with Nevada State College, (2) developing an interpretive area in the BLM Quarter Section or Nature Preserve at Whitney Mesa with Clark County School District, or (3) conserving lands in East Henderson with the Bureau of Reclamation and Southern Nevada Water Authority.

Other potential partners include the Regional Transportation Commission, Nevada Power, Nevada Division of Wildlife, Clark County Desert Conservation Program, the Nevada Department of Transportation, and the Clark County Flood Control District. While flood control projects typically have not provided funding for joint recreation or conservation purposes, there will be many more opportunities in the City to create linear parks and trails and establishing key linkages along flood control channels as part of the City's green infrastructure. Leveraging CCRFCD fund allows for the more economical construction of joint use projects.

Strengthen Coordination of Regional Planning Efforts

A regional organization that has taxing authority and that can acquire and manage open space and trail lands may be another option for long-term stewardship and acquisition funds—for Henderson and other cities in the valley. The Regional Open Space plan currently being prepared by the Southern Nevada Regional Planning Coalition will provide for a regional open space definition, identify opportunity areas, and investigate management strategies for regional open space. This plan recommends supporting the on-going regional open space planning efforts and actions proposed by the Southern Nevada Regional Planning Coalition. The City will still need to act independently to secure funds for remaining local program needs in addition to supporting regional projects.

Other Strategies

Establish a Non-Profit Foundation

City could support (or spearhead the creation of) a non-profit, tax-exempt (501(c)3) organization for the purpose of promoting and encouraging the advancement of open space and trails. Such an organization can do fundraising, accept donations, be an advocate for the program, manage volunteers, administer grants, and assist with maintaining open space and trails among other duties. Some cities have been instrumental in establishing and continuing to work with such anon-profit organization (e.g., Loveland Parks and Recreation Foundation in Colorado (see *www.ci.loveland.co.us/parksrec/Foundation.htm*) and Prospect Park Alliance in Brooklyn, New York (see *http://www.prospectpark.org*) whereby members of staff serve on the board and are directly involved in day-to-day operations of the foundation. It will be critical to involve key community leaders and businesses to have some corporate and neighborhood support who can help attract private contributions, endowments, and sponsorships. Contributors are eligible for tax benefits.

Work with Land Trusts

In many communities, land trusts are instrumental in managing land and conservation easements. Southern Nevada does not currently have land trusts actively acquiring and managing properties, however, national organizations such as Trust for Public Land and The Nature Conservancy are currently involved in planning efforts throughout the region. Local and national land trusts also play an important role in holding and managing conservation easements—a potential tool to limit land maintenance requirements for the City. However, land trusts need adequate financial resources, staff, and volunteers to fulfill their obligations of managing parcels. In Henderson it would take time to get a local land trust off the ground, however, it may be possible to collaborate with or expand on existing or regional organizations in the valley.

In-Kind Services

The City Support volunteers such as youth and student groups, seniors, and service clubs in adopt-a-trail or adopt-an-open space programs as described previously under Management Tools.

Department of Corrections Program

The City will investigate using the Department of Corrections labor pool to assist with O&M of open space and trails parcels.

Open Space Management Endowment

The City will consider establishing an endowment from the proceeds of land fund sales or other contributions and use the interest for operations and maintenance. This will be feasible only if a substantial influx of sales tax, bond revenues, or SNPLMA funds are dedicated for this purpose.

Estimated Costs

As with any effort to predict the future, it is difficult to anticipate the full range of costs associated with implementation of the open space and trails plan. In general, however, it appears that the revenue needed in the near term for development of trails and other facilities, land acquisition and other capital costs is available through the use of existing programs, especially the grant program associated with SNPLMA. These external funds cannot be used for maintenance or to cover other operational costs, so it will likely be necessary to obtain funding for these purposes from the City's general fund. An estimate of these costs is outlined in the 2010 scenario (Table 4-5), which is based on implementation of the projects that have received prior funding through SNPLMA as well as the Black Mountain Regional Preserve.

Based on an estimated cost of $100/acre in current (2005) dollars, the annual cost of maintaining these new properties would be approximately $163,700.

Additional maintenance costs will be associated with development of new trails. As shown in Table 3-X, an additional 30 miles of trail will be developed by 2010 (based on the assumption previously stated, i.e. implementation of those trail segments with SNPLMA funding). At an annual cost of $2,000/mile, total trail maintenance costs would be approximately $60,000 per year.

The combined maintenance and operations costs would be $223,700 each year for the first 5 years.

The magnitude of these costs would not appear to require immediate adoption of a new revenue approach or voter-approved funding initiative. In the future, however, as the City's open space and trails programs expand, it may become necessary to adopt new funding mechanisms. A variety of funding tools were outlined earlier in this chapter. In general, voters are more inclined to support funding measures that include both project development and maintenance activities than they are to support stand-alone maintenance. Therefore, the City should consider adopting a dedicated funding source for open space and trails in the future when revenue from other sources such as SNPLMA begin to diminish. Whether through a voter-approved property tax initiative or other strategy, any initiative presented to the public should specifically provide for the use of funding to maintain and operate the lands and facilities that are developed through adoption of the ordinance.

Project	Acres
Black Mountain Regional Preserve	1,377
Whitney Mesa Open Space	35
Bird Viewing Preserve (potential new area expansions)	140
Hidden Falls Park	60
Lake Las Vegas Wetlands Park	25
Total	**1,637 acres**

Table 4-5. Planned Projects to be Implemented by 2010. The natural area element of Cornerstone Lake Park is not included and is assumed to be part of the community park. See Table 2-2 for full project descriptions.

VI. CONCLUSION

The City should use a judicious blend of strategies and tools to develop and fund the open space and trails program, such as regulatory means, partnerships, reallocation of existing funds and staff resources, and ultimately, new voter-approved taxing or bond mechanisms. It is recommended that work sessions with the Parks and Recreation Board, Planning Commission, and City Council be held to determine the best course of action among the various options available. Small steps can be taken immediately towards implementing the City open space program irrespective of long-term funding sources. Continued public outreach, and successful immediate-term projects can foster public support for regulatory changes (i.e., flood control designs) and new funding mechanisms (i.e., dedicated sales or property taxes).

Other key considerations are as follows:

- Most open space will be conserved through modifications to existing regulatory procedures and policies rather than through acquisition.
- Acquire and provide stewardship for only those properties that are identified in this plan as having a public benefit or that meet the criteria of being physically accessible to the public, containing important visual resources or sensitive environmental resources, or that are connected to other parks, or public facilities. Limit acceptance of open space dedications to the City, except where a property demonstrates an obvious public benefit. Other mechanisms, such as conservation easements, allow for land to be conserved without the City being responsible for management costs.
- Seek outside sources, including grants and partnerships with other agencies, in order to leverage local funds.

An overarching purpose of the Open Space and Trails Plan is to ensure that open space and trail needs are considered when all development and recreation planning decisions are made. Further, the Plan serves as an important policy document that can effectively guide the City of Henderson in its transportation, recreation, public works, and community planning for the next five years.

In conclusion, landscape patterns matter. It is no longer appropriate to plan based on totals or averages of prices, jobs, wages, infrastructure costs, real estate values, parkland, water flows, and so forth. Rather, the arrangement of land uses, natural drainage ways, and scenic resources is crucial to making Henderson a place to call home.

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APPENDIX A: ACTION PLAN

The Action Plan is designed as a framework for tracking open space and trail actions that are necessary to attain the Open Space and Trails Vision. It is also designed to give decision-makers a useful tool for establishing future work programs and budgets. The Action Plan asks the question: "What do we need to do to make sure the Open Space and Trails Plan is successful over the next ten years?"

The intent of the Action Plan is to stay simple and create a mechanism for the Open Space and Trails Plan to "live" once the formal planning process is complete. It allows users to obtain a "big picture" reference point and an indication of priority actions for the future. It will be utilized in monthly coordination meetings to track progress as each strategy or landmark project are pursued, and should be updated regularly as funding and other variables change.

The Action Plan is organized in two parts. First, the Action Plan focuses on implementing the five strategies outlined in Chapter 4: Open Space Protection Strategies, Storm Drainage Strategies, Trail Strategies, Land Management and Stewardship Strategies, and Financing Strategies. Major steps for each Landmark Project are outlined under Open Space Protection Strategies to ensure that opportunities are pursued to the greatest extent possible.

Implementation Action	Timing			Implementing Department		Completed / Notes
	1 year	2-5 years	6-10 years	Lead	Coord	
Open Space Protection Strategies						
General Strategies						
Maintain a database of natural resource occurrences.	X			CD (LRP)	CD (CP)	Obtain annual updates from NNHP and MSHCP program.
Identify sensitive lands on future public disposal properties and future growth areas and continue to work with the BLM to determine the appropriate mechanisms to delineate and protect these lands prior to auction.		X		CD (LRP)	PR, PM	Collaborate with the BLM, Desert Conservation Program, and other agencies to establish this process.
Integrate green infrastructure planning into the future land use planning process.		X		CD (LRP)	PW (T), PW (LD), UT, PR	
Require disclosure of site-specific natural resources.		X		CD (CP)	PW (LD)	
Consider hydrology study concurrently with entitlements.	X			PW (LD)	CD (CP)	
Strengthen natural resource protection provisions.	X			CD (LRP)	CD (CP)	Strengthen Sensitive Lands Overlay District; Hillside Overlay District
Integrate open space system into subdivision and master plans.		X		CD (CP)	CD (LRP), PR, PW (LD), PM	
Change efficiency lot overlay to include usable park areas and natural areas towards open space requirements.	X			CD (LRP)	CD (CP), PR	
Consider developing design standards or guidelines to address development at the desert edge.		X		CD (CP)	CD (LRP), PR	
Protect the natural resources that the city already owns.	X			CD (LRP)	CD (CP), PM, PW (LD), PR	
Provide consistency between definition of "open space" in this plan and regulatory definitions.	X			CD (CP), CD (LRP)	CD (CP), PR	

Implementing Department/Division

CD (LRP) Community Development (Long Range Planning)
CD (CP) Community Development (Current Planning)
FR Fire
NS Neighborhood Service W (T)
PO Police
PM Property Management
PR Parks and Recreation
PW (LD) Public Works (Land Development)
PW (T) Public Works (Traffic)
UT Utilities

Implementation Action	Timing			Implementing Department		Completed / Notes
	1 year	2-5 years	6-10 years	Lead	Coord	
Establish or foster the development of a non-profit open space coalition.	X	X	X	CD (LRP)	NS, CD (CP), PR, PM	
Continue to Involve the Open Space Plan Advisory Committee and provide a quarterly update or newsletter regarding implementation status.	Ongoing			CD (LRP), PR		
Purchase lands only when necessary.	Ongoing			PM	CD (CP), CD (LRP), PW (LD), PR	
Landmark Projects: Additional Strategies						
Sloan Canyon Visitor Center: Pursue a Comprehensive Plan update that optimizes recreational, cultural, scenic, and wildlife resources.	X			CD (LRP)	CD (CP), PR, PW (LD), PW (T)	
Black Mountain Regional Preserve: Formalize protection of City-owned land through management plan; pursue County partnership of regional preserve.	X			PR	CD (LRP), CD (CP), PW (LD), PM	
River Mountains: Pursue a Comprehensive Plan update that optimizes recreational, cultural, scenic, and wildlife resources.		X		CD (LRP)	CD (CP), PR, PW (LD), PW (T), PM	
Southwest Henderson: Pursue a Comprehensive Plan update that optimizes recreational, cultural, scenic, and wildlife resources.	X			CD (LRP)	CD (CP), PR, PW (LD), PW (T)	
Upper Pittman Wash: Prepare landmark corridor (greenway) plan from Sloan Canyon NCA to lower Pittman Wash.	X			PR	PW (LD), CD (LRP), CD (CP)	
Cornerstone: Update Cornerstone Park master plan to optimize open space values and trail connectivity.		X		PR	CD (CP), PW (LD)	SNPLMA funded.
Whitney Mesa: Integrate ongoing master plans for nature center, nature park, CCSD nature center, storm drainage facilities, and unbuildable lands into a comprehensive system of open space and trails.		X		PR	ALL	SNPLMA funded.
Bird Viewing Preserve Area: Finalize master plan; identify additional targets for protection.	X			PR	CD (LRP), CD (CP), PM	SNPLMA funded.
Old Landfill Area: Identify trail corridor that optimizes open space values and trail connectivity.		X		PR	CD (LRP), CD (CP), PM	
El Centro: Finalize R&PP lease and pursue Comprehensive Plan update to for urban, interpretive, and public facility, and park uses.		X		CD (CP)	CD (LRP), PR, PW (LD), PM	
Heritage Museum: Formalize protection of interpretive context.		X		CD (LRP)	PM	SNPLMA funded.

Implementing Department/Division

CD (LRP) Community Development (Long Range Planning)
CD (CP) Community Development (Current Planning)
FR Fire
NS Neighborhood Service W (T)
PO Police
PM Property Management
PR Parks and Recreation
PW (LD) Public Works (Land Development)
PW (T) Public Works (Traffic)
UT Utilities

Implementation Action	Timing 1 year	2-5 years	6-10 years	Implementing Department Lead	Coord	Completed / Notes
Railroad Pass: Identify and protect critical wildlife corridors, viewsheds, and trail connections.		X		CD (LRP)	CD (CP), PR, PM	
Storm Drainage Strategies						
Build upon the mission of the Clark County Regional Flood Control District.	X			PW (LD)	CD (LRP), CD (CP), PR	Develop a formal policy basis to promote multiple use projects and maintain natural-appearing washes where public benefit is evident.
Investigate floodplain development policies.	X			PW (LD)	CD (LRP), PW (LD), CD (CP)	
Amend the Clark County Regional Flood Control District Hydrological Criteria and Drainage Design Manual to include alternate City design standards for projects located within the City of Henderson.	X			PW (LD)	CD (CP), PW (LD), PR	
Ensure that pedestrian environments adjacent to storm drainage facilities are provided.	Ongoing			PR	PW (LD), CD (LRP), CD (CP), PW (T)	
Ensure that pedestrian amenities within existing areas are provided.	Ongoing			PR	PW (LD), PW (T)	
Protect significant natural washes.	Ongoing			CD (LRP)	PW (LD), PW (T), CD (CP), PR	
Trail Strategies						
Consider the needs of non-motorized trail users in all development decisions.	Ongoing			ALL		
Ensure consistency between bicycle, pedestrian and trail facility plans and definitions.	Ongoing			PR	CD (LRP), CD (CP)	
Strengthen trail corridor dedication provisions in the code.	X			PR	CD (LRP), CD (CP)	
Amend code to require internal and external connectivity within subdivisions.	X			PR	CD (LRP), CD (CP)	
Address safety concerns within trail corridors.	Ongoing			PR	PW (LD), CD (CP), PW (T), UT	
All current projects should be reviewed against the trails framework plan, trail design standards, and trails classifications to identify potential impacts to recommended alignments.	X			PR	PW (T), CD (CP)	
Complete critical, uncompleted segments of the existing trail system.	X			PR	CD (CP), PW (T)	

Implementing Department/Division

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UT Utilities

Implementation Action	Timing			Implementing Department		Completed / Notes
	1 year	2-5 years	6-10 years	Lead	Coord	
Perform pre-design to verify landmark trail alignments in West Henderson. Ensure consistency with trail design and the adjacent Sloan Canyon National Conservation Area.	X			PR	CD (LRP), PW (LD), PW (T)	
Fully integrate trail planning in future growth areas with an emphasis on trails within landmark corridors.	Ongoing			PR	CD (LRP), PW (T), PW (LD), PM	
Land Management And Stewardship Strategies						
Develop management plans for public open space properties.	Ongoing			PR and PM	ALL	Should be reviewed annually and updated every 5 years with tasks, operational policies, and land management goals.
Coordinate and form partnerships to implement this plan and to management open space properties.	Ongoing			PR and PM	ALL	Work with other agencies including Clark County, BLM, BOR, NPS, CCFCD, other agencies, and developers.
Develop a volunteer steward program.		X		PR	PW (LD)	
Develop a safety/risk management program.	X			PR and PM	ALL	
Financing Strategies						
Continue to incorporate the open space and trails plan and supporting bicycle and pedestrian facility plans into regional plans.	X			CD (LRP)	PR, PW (T), PM	
Continue to participate in the neighborhood services' grants clearinghouse.	Ongoing			NS	CD (LRP), PW (LD), CD (CP)	
Continue to track deadline dates.	Ongoing			Varies		
Foster and document community support.	Ongoing			ALL		
Identify future eligible projects and funding criteria.	Ongoing			ALL		
Develop a suite of funding tools.		X		ALL		e.g., Potential revenue sources, grants and ousiide sources, partnerships and regional activities, etc.

Implementing Department/Division

CD (LRP) Community Development (Long Range Planning)
CD (CP) Community Development (Current Planning)
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APPENDIX B: LITERATURE REVIEW OF LAND USE AND CONSERVATION TOOLS FOR PROTECTING OPEN SPACE IN HENDERSON, NEVADA

Open space protection largely pertains to patterns of land use. The Comprehensive Plan establishes the community's pattern of future land uses, which are represented in a future land use map. Tools are then employed to effectuate its land use plan. Chapter 4's strategy for protecting the City's open space resources is composed of a range of planning tools, regulatory tools, and administrative approaches. The City of Henderson already has many tools at its disposal that can further open space protection, namely a zoning map, the Hillside Development Ordinance, and the Sensitive Lands Overlay. As noted in the Action Plan, the future land use map and zoning map should be updated to acknowledge the community's interest in the landmark projects shown on the Open Space and Trails Framework Map.

As there are hundreds of tool variations available, some tools may be more effective and appropriate than others. This Appendix begins by presenting a brief bibliography of encyclopedic references on tools and their applications. This is followed by case studies of how peer cities have used these tools as part of a comprehensive strategy to protect community resources, with particular attention to sensitive lands and the edge zone.

Encyclopedic References

Levy, John M. Contemporary Urban Planning. 2003. 6th ed. *New York*: Prentice Hall. Chapter 9: The Tools of Land-Use Planning is a useful primer on the two broad categories of actions by which a community can shape its land use pattern: regulations (land use controls) or incentives (public capital investments).

Utah Critical Land Conservation Committee. Land Conservation in Utah: Tools, Techniques, and Initiatives. January 1997. Available at http://governor.utah.gov/planning/CriticalLands/white.htm. This study includes relevant discussion on the role of private conservation organizations such as land trusts, and the conservation of private lands. The concluding sections, Land Conservation Tools and Techniques and Appendix A: Open Space Tools Matrix, describe the application, pros, and cons of several of the tools recommended in the City of Henderson Open Space and Trails Plan.

City of Peoria. Desert Lands Conservation Master Plan. 1999. Available at http://www.peoriaaz.com/planning/Docs/Publications/DesertlandsPlan99.pdf Section 11: Desert Conservation Techniques, identifies a complete palette of desert conservation techniques and assesses their feasibility in achieving specific goals based on cost (both short- and long-term), ease of implementation (both technically and politically), legality, degree of cooperation required with other agencies or political jurisdictions.

Case Studies

Case Study #1: Explorations at the Edge

Joseph Ewan and Michael Underhill at Arizona State University were asked by the City of Phoenix to explore strategies and designs along the edge of the new Sonoran Desert Preserve. They found that an overall physical strategy, or "Edge Coordination Plan," for the Phoenix area is needed to coordinate development at the Edge that will protect the rich desert environment within the preserve while creating high quality urban development within the edge region. Because a viable strategy must address a change in traditional land use development patterns, it may best fit within an element of the City's Comprehensive Plan. Otherwise, it could be developed as a stand-alone land use Subarea Plan at a higher level of specificity addressing the interface between locations where protected open space will abut future development, and address the broad range of concerns unique to the Edge condition.

A viable strategy must include, at a minimum, the following three components:

1. **An Analysis of the Physical Condition of the Landscape**, including an analysis of damaged areas and ecological processes that must be maintained.

   A thorough understanding of the physiography of protected open space at the Edge is required prior to responsible planning and urban design policy-making. The assessment should examine the land as a mosaic of ecosystems and life zones, in order for planning and development to respond to the natural environment in a way that ensures its ecological integrity. Priority should be given to patches of wildlife biodiversity and the habitats and corridors necessary to sustain them. Physical processes, such as the hydrological regimes of washes and floodplains, should be permitted to continue or be restored where necessary, in order for dependent biotic functions to continue. Areas that have been disturbed by human uses, such as OHV use, grazing, agriculture, or previous development should be identified as they may represent opportunities for more intense recreational uses, more intense development, or restoration. Identifying such valuable areas is critical to good planning and should play a significant role when making land use decisions at the scale of the Edge.

2. **Appropriate Public Uses Adjacent to Open Space**, including a comprehensive trail plan, a tiered system of access points, visual access, and public land uses.

   Once natural resources have been prioritized for conservation, public recreational uses can be better planned to facilitate exploration of the desert without inviting damage to sensitive areas. The trails plan should take into account the features of interest within the preserve, together with the system of access points, public transportation, and adjacent streets and land uses. Providing fewer well-planned and well-placed access points is preferable to many poorly developed access points that promote trail blazing and spider-web trails. All access points should be mapped and developed at the appropriate regional, community, and neighborhood scale.

   Another type of access to provide is visual access, which sometimes even reduces the need for direct physical access points. The planning of scenic routes and the context-sensitive design of roads to optimize views while preserving open space resources (especially wildlife corridors) should be a key element. Locating parks with views to the open desert can enhance park users' experiences, act as buffers, and absorb heavy uses and active recreation on more developed sites. Combining parks and trailheads will also allow facilities to be shared and the trailheads to be more visible to the adjacent communities.

   Other appropriate public uses include community centers, fire stations, police substations, and schools with the intent to promote public uses at the Edge that can instill appreciation for the beauty, diversity, and wonder of the open space resource. A sense of public access to taxpayer-purchased open space is imperative.

3. **Private Development at the Edge**, including appropriate architecture and housing typologies.

   As described above, views into the desert are crucial elements to consider. Coordinating community centers, parks, schools, and interpretive areas at the Edge will depend upon close collaboration with private developers. In all areas, and particularly in higher density areas, public architecture should be compatible with the desert and should set an example for private development. Native colors, native plants, local materials, and forms and art indigenous to the region seem to be more palatable adjacent to the natural environment.

   The private, detached single family home is the most common form built at the edge of public land, a use that lends a feeling of privatization over immediately adjacent open space. Suggestions regarding how developers might build housing near the desert edge is perhaps the most controversial point of discussion at the edge, because it deals with the apparently incompatible interplay between embraced American concepts of privacy and community. Higher-density housing may be recommended at select points along the edge—density that is coordinated with nonresidential development to increase the feeling of an active community in harmony with the natural environment.

   In order to change the traditional building practices at the edge, substantial cooperation between developers and the public sector will be necessary. Incentives and regulations, rather than voluntary compliance, will yield the greatest results. Phoenix is developing a weighted crediting system and design review guidelines to promote creativity while ensuring quality at the edge.

Case Study #2: City of Phoenix Sonoran Desert Preserve Edge Treatment Guidelines

This document also provides very specific design guidelines for treatment of the boundary of the Sonoran Desert Preserve for residential, commercial and other zoned land uses that approach the open space edges.

Open edge treatment encourages the sense of ownership of the Sonoran Desert Preserve from the greater community, rather than only those located at the edge. Facilities such as parks, schools, recreational facilities and retention areas allow both visual and physical access to the preserve. Typically, these are separate parcels, where they would provide no edge credit to developers. By allowing them to be included in a master plan for open edge treatment, siting at the edge is encouraged.

Where rezoning occurs adjacent to the Sonoran Desert Preserve, encourage development on slopes than ten percent, consistent with the General Plan, to maintain the Preserve as a visual amenity for all citizens and to maintain connectivity between mountains within the same range. Where private lands intersect the boundary, at least 60% of the linear edge must be open for public access to the Preserve, in accordance to the preserve's intended use as a visual and recreational amenity for all.

Case Study #3: Scottsdale, Arizona's Citizen's Guide to Environmentally Sensitive Lands

Purpose

The purpose and intent of the Environmentally Sensitive Lands Overlay (ESLO) is to identify and protect environmentally sensitive lands in the City of Scottsdale and to promote public health and safety by controlling development on these lands. The ordinance supercedes a previous Hillside Protection Ordinance. It requires that a percentage of each property be permanently preserved as Natural Area Open Space and that specific environmental features be protected, including vegetation, washes, mountain ridges and peaks, to assure appropriate development.

Goals and Major Components

The ESLO was established in order to:

- Encourage the protection of unique and sensitive natural features in the Upper Sonoran Desert, including but not limited to the mountains and hills, large rock formations, native landscape, archeological and historical sites and significant washes.
- Encourage development that blends with the character and nature of this special desert setting.
- Protect the public and property from the special hazards that can be found in this desert setting.
- Minimize the costs to build and maintain the public infrastructure necessary to sustain the use of the land.

Intensity of Development

The intensity of development is the amount of land use and building that occurs within a specific amount of land area. For residential land uses this is typically measured in units (residences) per overall gross acreage of the property and is referred to as density. The amount of use and development that is allowed decreases as the slope of the land increases (becomes steeper).

Open Space Requirements

In the ESLO there are requirements for providing Natural Area Open Spaces (NAOS). NAOS areas are either natural desert that have been undisturbed by development activity or where development has restored the desert terrain and vegetation to its natural condition. These open spaces are generally different than those required by the underlying zoning districts, but in some cases it may be possible for an open space area to meet requirements for both the ESLO and zoning district requirements.

Case Study #4: Phoenix Desert Character Overlay District

This Plan states three implementation tools aimed at integrating the "desert character" into development in the northeast area of the City. It also focuses on conservation of:

- Wildlife habitat and corridors,
- Undisturbed wash corridors,
- View corridors, and a
- Network of trails.

In addition to the General Plan Amendment which established a cap on residential densities and the goal set leading to the Sonoran Desert Preserve, the Plan called for development of zoning overlay districts for the three identified Desert Character Areas – the Desert Preserve, Rural Desert, and Suburban Desert.

The overriding purpose of the Overlay is to guide development that will blend with the undisturbed desert rather than dominate it. Residential density for Subdistrict A is limited to1.2 dwelling units per acre (du/ac). This area is characterized by numerous undisturbed wash tributaries to Cave Creek Wash and pristine Sonoran Desert vegetation. It is the intent of the Overlay in Subdistrict A to provide regulatory guidelines for compatible development which will provide a transition from Arizona Preserve Initiative land (open space) to more developed areas.

Subdistrict A is strictly limited to large lot residential development with a minimum lot size of 35,000 square feet. Development of the lots will be based on use of building envelopes with area outside of the envelope maintained in an undisturbed natural state. Areas that experienced prior disturbance are addressed by guidelines allowing revegetation.

Subdistrict B provides a range of densities from 2-5 du/ac. With a requirement that 50 percent of any parcel be maintained undisturbed desert, it is envisioned that true cluster development will be the predominant development style in Subdistrict B. Allowances are made to allow attached residential product with a range of heights to enhance the potential for successful cluster development.

The Overlay addresses a number of items that are currently not addressed elsewhere by city ordinance or policy, setting new standards and criteria for development. The more universally applicable elements include the use of a site analysis for the siting of developable areas, establishment of criteria for the conservation of wash corridors, clear definition of the use of building or construction envelopes, building height in the context of the desert vegetation, and residential cluster development. Regulations and design guidelines work together to provide development that will be compatible within the context of the Sonoran Desert. The Plan further discusses specific design guidelines for building height envelopes and residential cluster housing.

The City of Phoenix Municipal Code, Section 653 – Desert Character Overlay Districts implements this north land use plan, defines the nature of development while maintaining undisturbed areas, and provides guidance for new development to occur within the context of the fragile undisturbed desert. The key to successfully maintaining interconnected undisturbed desert and washes, lies in analysis of individual subdivision sites before laying out the design of streets and lots.

Case Study #5: City of Peoria, Arizona Desert Lands Conservation Overlay

Prior to adoption of the General Plan, efforts to protect natural resources had already begun with the City Council's adoption of the Desert Lands Conservation Master Plan in 1999. This plan focused the city's conservation efforts by identifying a set of programs and policies to provide open space, parks, recreation corridors, and protection of culturally or environmentally unique or sensitive areas in Peoria. The Peoria City Council is considering a new Desert Lands Conservation Ordinance that would set new guidelines for new developments in sensitive areas. Planning efforts are working to the benefit of all Peoria, not just communities that have yet to be built. Since adoption of the Desert Lands Conservation Master Plan, the City Council has (through the zoning process) negotiated over 3,600 acres of open space, mountain preserves, and parks either already dedicated or designated for dedication to the city for the enjoyment of all Peoria residents.

The purpose of the Desert Lands Conservation Overlay (DLCO) is to identify and protect the unique and environmentally sensitive Sonoran Desert lands in the City and to promote the public health, safety and welfare by providing appropriate and reasonable controls for the development of such lands. The DLCO is intended to:

- Identify sensitive desert conservation features and resources.
- Protect and preserve Peoria's distinctive desert landscapes and wildlife habitats for the enjoyment of current and future generations.
- Protect people and property from hazardous conditions characteristic of environmentally sensitive lands and their development.
- Integrate conservation design into the development of sensitive desert lands and employ development standards and guidelines that equitably balance conservation and development objectives.

In addition, the DLCO is intended to implement the goal, policies and objectives of the Desert Lands Conservation Master Plan (DLCMP). The overlay establishes a holistic approach to evaluating the environmental conditions of each site that allows both City staff and the development community a better basis for determining conservation areas. The overlay also establishes criteria for determining conservation priorities based on the potential to expand or extend a regional open space corridor, the opportunity to provide a link to an existing or future trail system, the possibility of expanding an existing open space, or the possibility of creating a buffer zone between different intensities of uses.

The DLCO establishes standards and design guidelines for development within desert areas and adjacent to conservation areas. These regulations and guidelines vary by landform type in order to address the three distinctive types of geography (desert floor, bajada and hillside) found in the Peoria desert areas.

The DLCO focuses on conserving the following sensitive features:

- **Cultural Resources**: Prehistoric and historic sites identified according to standards established by the State Historic Preservation Office. Includes artifacts such as rock walls, etc.
- **Isolated Peaks**: The prominent peaks which jut out of a typically flatland area. These are landmark features whose rugged vertical form contrasts sharply with the horizontal ground plane.
- **Mountainous Areas**: Areas such as the Hieroglyphic Mountain Range which include numerous peaks, rugged topography, steep slopes and small v-bottomed washes flowing out of the area.
- **Plateaus**: An extensive land area characterized by slopes leading to a relatively level surface and situated at a uniformly higher elevation than adjacent land on at least one side.

- **Primary Peaks**: Prominent peaks that are visual landmarks from various points of view and rise at least 400 feet above the surrounding base elevation.
- **Riparian Vegetation**: Native vegetation that grows where there is a concentration of sustainable drainage water resulting in larger plants, greater species diversity and greater density.
- **Riverine Area**: Environmentally diverse riparian areas associated with the New River and Aqua Fria Rivers and Major Washes (see Wash, Major below).
- **Rock/Boulder Formation**: Formations including escarpments, cliffs or pinnacles which consist of exposed rock faces with limited vegetative cover.
- **Significant Vegetation Area**: Generally located adjacent to a wash or other source of water and best maintains the character of the site when protected in place.
- **Significant Vegetation Specimen**: A native tree with an 8" or greater caliper trunk and multi-trunk in good health, a saguaro over 20 feet in height and/or multiple arms or crest or other unusual configuration in good heath, or other mature protected species, such as Ocotillo.
- **Skyline Ridge**: Ridge lines and ridge line complexes which are visible from existing and/or planned collector and arterial roads and meet a number of other specific conditions.
- **Spring**: A permanent small stream or source of water coming out of the ground.
- **Talus Slope**: A slope strewn with a layer of loose rock debris, usually over unconsolidated soils.
- **Unstable Slope**: A slope that exhibits one or more of the following conditions: boulder collapse, boulder rolling, rock falls, slope collapse and talus slopes.
- **Wash, Major**: Washes that because of its size is more riverine in character than secondary washes.
- **Wash, Primary:** Wide, sand bottom washes that carry drainage from a relatively broad watershed and are fed by a number of smaller tributary washes.
- **Wash, Secondary:** Tributaries to the significant washes and the rivers.
- **Wildlife Corridor:** Pathways or habitat linkages that connect discrete areas of natural open space otherwise separated or fragmented by topography, changes in vegetation, and other natural factors in combination with urbanization.
- **Wildlife Habitat:** Locations where native wildlife has a tendency to congregate due to provision of food, shelter and/or water.

Desert Lands Conservation Report

The Overlay requires that a comprehensive report be submitted as part of a rezoning, platting site plan or building permit request that reviews existing conditions and site and project characteristics. For projects larger than 10 acres, this shall be the Desert Lands Conservation Report (DLCR). Projects of 10 acres or less may submit a Master Conservation Plan (MCP). The master conservation plan includes identification of conservation features, native plants, and landscape character. If a development request is being proposed on a property for which an existing DLCR is on file with the City, the Planning Manager shall determine what information, if any, needs to be updated. Note that the development of a single-family custom home shall not require a Desert Lands Conservation Report or Master Conservation Plan. The developer of a single-family custom home shall indicate on the site plan the location of conservation features to be preserved.